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## REACTIONS TO LIGHT AND DARKNESS.<sup>1</sup>

By G. STANLEY HALL and THEODATE L. SMITH.

Cox, in his mythology of Aryan nations, following the lead of Max Muller, traces not only the Greek epics but a large part of the Aryan myths to a solar origin. When to this fact is added the prominent rôle which the heavenly bodies assume in Indian folk tales, and the important part which light plays in the development of both plant life and animal organisms, the subject becomes most suggestive as a field of psychological research. Of the many problems which the subject presents, it is the aim of this paper to discuss only those which are directly concerned in psychic reactions, though incidentally some physiological effects are included in the returns. Of these, 427 have been tabulated, 312 of which are from normal school pupils of ages varying from eighteen to twenty-two with a very few above and below those ages, while 38 are from children of the 5th grade, of from ten to twelve years old. These cover a more limited range of topics and have been tabulated separately. 77 returns are from negroes, 28 of these being from a colored girls industrial school, the ages of the pupils ranging from ten to sixteen years, and 49 from a mixed colored school; 23 of these are males of ages varying from sixteen to twenty-seven; 26 are girls of ages sixteen to twenty, only two being above that age. No specific differences have appeared between the returns from white and colored pupils except such as can be directly referred to degree of educational opportunity. The figures given represent always the number of cases and not the number of papers, as the two do not always coincide. All answers which showed a lack of comprehension of the question have been excluded in tabulating results. For obvious reasons no classifications on sex lines have been attempted, and no definite age limits at which theories, fancies and sentiments were most prominent in mental life can be

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worked out as the data are very vaguely given in the returns. The first topic of the syllabus has reference to reactions at dawn and to the fancies and feelings closely connected with it. It was as follows:

In studying the reactions of sense, mood and motion to different degrees of light, we need many experiences based on observation upon children, reminiscences of adults, and present feelings of young people and adults. In general, bright light increases activity of all kinds, and darkness tends to diminish it, but the items wanted are more special, as follows:

1. Reactions of feelings at dawn. Is its advent longed for on waking too early; is there ever any anxiety lest it should not come or is unduly delayed; any feeling that the sun makes a great effort or has great labor to move up over the horizon, to break through or drive off clouds, or to banish darkness as if it were its enemy; any feeling of dualism as if light and darkness contended or struggled with each other, or as if day and sunrise was a victory, as if ghosts or any other night fears were driven away? State fully any fancies, dreams or romances. What makes the sun rise; by what power?

In tabulating the returns on this topic, it appeared that out of 389 cases, 207 had experienced longings for dawn in health and 123 during illness, making a total of 330 or nearly 85%. Twenty-two of these answering the question, however, state that the feeling was only on occasion of some expected pleasure which morning was to bring. The character of the longing in the other cases, which varies from mere restlessness to a real light hunger is illustrated in the following extracts quoted from the returns.

F., 19. When I awake before dawn as I often do if I have anything on my mind, I feel an intense longing for daylight almost as if I were in bondage to darkness and the light would set me free.

F., 18. It sometimes seems as if the dawn would never come. (A quite frequent expression.)

F., 18. It sometimes seems as if daylight would never come although I never have any real fear lest it will not come.

F., 17. On my sixth birthday, I thought the dawn would never come. I was to go to Philadelphia to meet my father.

F., 19. As far back as I can remember, I have never wished for the dawn. I love the night and what it brings, darkness, rest, stillness, peace, pleasant dreams and a great overpowering calm. It has always been the same. I have longed for night. It soothes and lulls me and I love to lie awake and build air castles.

F., 18. Sometimes during a night of illness I have longed for dawn but I never remember longing for the dawn when I was in good health. Neither have I had any anxiety lest dawn should not come except when I have been ill or worried, then sometimes the hours seemed very long and dawn afar off.

F., 20. I have thought that dawn would never come but I always had an idea that it would come sometime.

F., 19. As a child I do not remember ever longing for day break except when there was some special reason such as sickness or anticipation and at such times the early morning hours have seemed unduly delayed. But about a year ago, when visiting, a child of three slept with me for several nights. Regularly at dawn this child would

awake and begin at once to romp to play and was not satisfied until every one within reach was awakened also.

F., 19. When I was about seven I sometimes fancied that the dawn would never come; then I used to wonder what would happen if the sun would never come again; tried to imagine how we would live if it were always dark. These fears always disappeared with the night.

F., 19. When about six to ten years of age, I thought that when the light came everything was bright and happy and I always felt like jumping and skipping about.

F., 20. I do not long for the advent of dawn on waking too early but always desire to sleep longer and wish that it would not come.

F., 22. As far back as I can remember I have had a very peculiar feeling when I awakened before dawn. The feeling is as if all my nerves were tingling with an intense longing for light.

Only 61 out of 312 had felt any anxiety lest dawn should be delayed and 46 of these cases occurred during illness. Of the remaining fifteen cases, five can be traced to a specific cause and the language of the remaining ten leaves it somewhat doubtful as to whether the anxiety was real or a mere figure of speech. 184 state positively that they never experienced any such feeling and 79 leave the question unanswered. In this case and throughout the paper these failures to answer cannot be considered as negatives, since they represent, as stated in many instances, failures to recall distinctly, lack of observation or thought on the topic and, in some cases, a failure to comprehend the question. Out of 338 cases, 78 had, at times, experienced a fear lest morning should not come; 32 of these being ascribed to illness and the remaining 49 to some period of childhood. 267, nearly 80%, stated that they had never experienced anything of the kind and 80 left the question unanswered. In these returns it is to be noted that only 5% of the total number of whites answering the question had ever experienced the fear while in health, and that all these cases are referred to childhood, while over 37% of the colored state the existence of the fear without time reference. The character of these feelings is illustrated in the following quotations.

F., 19. Once after a great thunder storm in the night I was afraid lest morning should not come. I was about seven years old and I thought maybe we would have darkness for a long time.

F., 18. I never felt any anxiety lest the sun should not come. I never thought about it. I always felt that the sun glides up very gracefully without the least effort. Sometimes it seems to have a struggle to break through the clouds.

F., 19. Many times on waking early in the morning I have become very impatient and gotten up to see the time, as I think daylight will never come. When a child I would often lie in bed early in the morning and watch the sun rise. It seemed to me to have great difficulty and to be struggling with the clouds. The sun always appears to me as if it were struggling to banish darkness.

F., 21. Many times on waking early in the morning I have gone to the window to see if the sun had yet risen and wondered what was

delaying it. I have imagined that the sun had great difficulty to move up over the horizon. I often thought it stopped for a few moments of rest and then proceeded on its journey.

F., 19. I recalled the chapter where Joshua commanded the sun to stand still and was afraid the sun might be delayed in rising.

F., 17. I can remember feeling an anxiety lest the dawn should not come when I was about six years old.

F., 19. I always took it for granted that the dawn would come.

### FEELING THAT THE SUN MAKES AN EFFORT.

Of 312 answering the syllabus 102 had once felt or still had the feeling that the sun makes an effort or has labor to move up over the horizon, break through clouds or banish darkness; 106 had never had the feeling and 104 gave no answer—an almost equal division of results. 102, 27%, had experienced a feeling of struggle between light and darkness, usually accompanied by the feeling that the sun was a victor; 202, 50%, had no such feeling and 85 gave no answer.

F., 18. In watching the sun rise I have often felt that it made an effort to get through the clouds and above the horizon. When it did finally appear I would draw a breath of relief.

F., 19. The sun seems to me to glide from behind the hills without any effort.

F., 20. It always seems to me that the sun moves with ease and as if darkness and clouds were dispelled easily.

F., When I was about six years old I used to think that it was an effort for the sun to get up in winter. I thought that the sun liked to lie in bed when it was cold. I thought that there was some force which pushed the sun over the horizon and then the sun was able to proceed without further assistance.

F., 19. I have no feeling that the sun makes an effort but rather that the clouds make way for it.

F., 19. It always seemed as if the sun came up as easily as a balloon would rise.

F., 17. I never felt that the sun made an effort to rise but rather that he was so strong and mighty that he shone right on whether clouds came before him or not.

F., 20. It never seemed to me that the sun made the least effort in rising for I associated its progress with that of a swiftly moving winged creature whose face gave out the light; but as the darkness never seemed embodied, the idea of strife between light and darkness is a figure which never entered my mind.

F., 19. As I watch the sun move up over the horizon, I always have a feeling that it is being slowly pushed up by something. It seems to me that it is trying to push away the clouds. After a shower, it has seemed to me as if the sun made a great effort to banish the darkness.

F., 20. When I watch the sun coming over the horizon I always imagine that some one is behind it in order to push it over the horizon.

F., 19. I never had any feeling that the sun makes a great effort to move up over the horizon unless it has to break through clouds, and then I imagine it is like a mad person rushing right through all obstacles and then coming out victorious with smiling face.

F., 18. Looking at the sunrise I have thought that something was holding the sun down so that it could not rise (13 yrs.).

F., 19. The house in which I live faces the east and directly in front of it is a rather thick wood. As the sun rose I often thought it was making an effort to get away from the branches of the trees.

F., 17. I have had a feeling that the sun made an effort to rise above the clouds but the feeling was not very pronounced. When the sun did come up I experienced a feeling of relief.

I have never felt that the sun made an effort to get up through the clouds but I have often felt that the moon did.

F., 19. When looking at the sun rising I often, as a child, and even now have the feeling that it has to make a great effort to get over the horizon. I have had a similar experience with the moon.

F., 17. I knew that the sun was stronger than the clouds and I used to feel happy when he emerged from them.

*Feeling of Dualism Between Light and Darkness.*

I thought that darkness and light were kings of two different realms and that at dawn they struggled for possession, when the king of darkness finding that he would soon be overcome fled in great haste from the scene of conflict (9 yrs.). I had an indistinct notion of conflict between light and darkness. When I saw the sun rising, I thought it had been asleep during the night and was just getting up.

I have watched very few sunrises and cannot remember ever feeling that the sun made an effort or that it was hard work for it to get over the hills or clouds. I never had a feeling of any conflict.

I never felt that there was any struggle further than that the sun was chasing the darkness before it.

I thought of the darkness as something that might gather me up, then the glorious sun chased the darkness away.

The only fancy that I ever had about the sun was about its rising on a cloudy day. Then I thought it was trying to struggle away from the clouds and when it had, at last, succeeded it was laughing because of the victory it had gained.

I have often thought that the clouds were simply obstacles in the sun's way and that he gained a great victory when he had passed through one and thus had courage to struggle through the next cloud when he came to it.

F., 18. As a very little child I thought that light and darkness struggled continually, but when I was seven or eight years old my opinions changed and I began to think that light and darkness were brother and sister, one helping the other all the time and when light was tired darkness stepped in and put her to bed.

F., 19. It did seem to me like a conflict between light and darkness in which I felt the sun and light would conquer and drive away the darkness. I have noticed the feeling that there was a victory over the clouds more with the moon than with the sun.

F., 19. I have always thought that light was contending with darkness to see which one could banish the other. I have imagined that as soon as it was dark, ghosts came out and held conversation with one another but that as soon as it grew light they vanished and hid themselves in church yards and other dreary places. As I became older I lost all such fancies.

F., 19. I never had any feeling of dualism as if light and darkness contended with each other; but I do sometimes have a feeling as if sunrise and day were victorious over darkness and night.

F., 17. I have never had the feeling that light and darkness contended with each other or that day and sunrise were a victory. Yet I like poems that express such sentiments.

Of the 427 cases tabulated 154, over 36%, give no sunrise

theories or fancies except such as were directly derived from the study of geography, without elaboration. This estimate, however, includes all the cases of "cannot remember," "do not recall," and failure to answer, as well as the direct negatives, so that it is probably too large to be representative. Seven children and six adults had never seen a sunrise. The negative in these cases is probably an absolute one.

Of ideas occurring frequently the following are typical. God makes the sun rise, 43 times; it is pushed or pulled up by some person or power, 38 times, and rises by its own power, 42 times. These three ideas are so varied and elaborated by individual fancy that the number of forms in which they are embodied seems limited only by the number of individuals. In the returns from children, three gave heat as the cause of the sunrise; two, clouds and two pressure of daylight. A boy of twelve said, "the light of the sun gives it strength to come up in the sky."

No line of demarcation can be drawn between sunrise theories and fancies as the element of fancy enters very largely into all the theories, but the variety and richness of fancy and the tendency of the normal childish mind to seek some explanation of natural phenomena is fully illustrated in the succeeding pages.

F., 18. When a small child I had an idea that the sunrise was God lifting up his curtains and the sun helped to hold them up.

F., 8. My theory of sunrise was that it just came out of the earth. I still always think of it in that way though I no longer believe it.

F., 19. I thought the sun got up in the morning just as people do.

F., 8. I thought there was some force which helped or pushed the sun over the horizon and then the sun was able to proceed without further assistance.

F., 20. Before I was seven I often used to wonder what made the sun rise. I used to think that God must get back of the sun and push it up in the sky.

F., 14. The sun never seemed to me to be propelled by any force but simply rose in the horizon and moved across the heavens by its own free will just as a person strolls leisurely along a pleasant pathway.

F., 17. It seemed to me that the sun rose as a bird might fly upward by its own power.

F., 18. I thought there must be a sort of machine inside the sun by which it could move.

F., 20. I always thought of the sun as having the power of voluntary action.

F., 19. When a child of about five, I imagined that God made the sun rise. I never thought where it went at night, but thought of it as some great person showing superiority. I imagined it to be a proud person with golden hair and that the clouds and darkness were glad to flee from as they were afraid that they would melt.

F., 18. The thought what makes the sun rise, "by what power," never entered my head.

I don't think I ever thought what power made the sun rise.

I just thought of it as getting out of bed and fighting.

M., 19. I never formulated any childish theory as to what made the sun rise, it seemed perfectly natural and the idea never occurred to me.

Some theories of sunrise, given as reminiscences, are :

F., 18. I felt that some one was pushing the sun up and that the sun was a heavy load.

F., 17. I used to think that God had a long pole and pushed the sun up to us when he wanted us to get up and up from the little Chinese boys and girls when he wanted them to go to bed. I used to try to think and reason out why the sun did n't go out when it came up from the sea, just as a lighted match did when I stuck it in the water.

F., 19. I never had any theories of what made the sun rise, I thought that it simply rose of itself without any help.

F., 18. I used to think that the sun rose just as we do because it was morning. I never associated sunrise and early dawn together.

F., 19. When I was a small child I had a fancy that the sun was a large ball on a string and God pulled it up. When I grew older it seemed more like a smiling person, and as I had been told that the earth was very large and the sun spent the night on the opposite side from where we lived, I, of course, thought sunrise was the sun coming back to us, but not as I think of it now, always as a person.

F., 18. When I was a child of six or seven years old, I could offer no explanation other than that the sun was a large moving ball of fire, but when I was about four or five years old I thought that the moon was God's big eye and the stars were his candles.

F., 19. I thought there was a man pushing the sun upward and that darkness flew in front of him so swiftly that by the time the sun was ready to sink, the darkness had come around the earth and was closely followed by the sun until wearied, when the sun would again overtake him.

F., 18. I thought of the sun as pulling himself up like the weights of an old-fashioned clock.

F., 20. Sunrise is occasioned by the shooting of the cannon.

F., 17. I have sometimes thought that there was a powerful engine behind the sun which pushed it.

F., 18. I always think of the sun as a large horse prancing up over the hills.

F., 20. As a child I never had a thought of what made the sun rise.

M., 12. The heat is so hot it makes the sun rise; the power is that the heat is so strong it comes up.

M., 13. What makes the sun rise is that it has power just like a man or boy that has muscles. The power that makes the sun rise is the mind's power.

F., 12. The sun rises because it wants to show us light.

F., 11. I think air makes the sun rise. The earth causes it to come up in the sky.

F., 18. The sun was always running races with me to see who would get dressed first.

F., 10. I think clouds make the sun rise.

As a child I always thought that there was a beautiful fairy with golden hair, blue eyes and a long flowing robe who was the mother of the sun and every morning she gave the sun a bath and dressed it in a beautiful golden dress and sent it out for a walk. When we had cloudy days I used to think that the sun was ill and could not go out for a walk.

I used to think the sun was a great ball which simply rolled about



in the heavens and explained its rising and setting that way. As a child I thought that the sun was run by machinery. I thought that the sun floated along in the air like a balloon and God sent it.

When I was very young, about four years I think, I thought the sun was God. When it was dark I thought God was asleep.

I always pictured the dawn as an airy graceful girl in glistening robes, but somehow with all her gaiety and coquetry she never in any way appealed to me.

When watching the sun rise I am very apt to think of an old man with a heavy pack on his back. I had this idea at about seven and it still continues as an association.

I never had any fancies connected with the dawn (!)

I thought one time as I saw the sun rising through the clouds that it seemed

F., 18. I had heard a discussion about Mormonism in which a case was discussed of a husband being so cruel to seven wives that they had risen in arms and pushed him out of the house, at least that was the way I understood it. Now I thought that the sun was a person and imagined that every morning his wives pushed him out of the house and he came through the sky. (4 yrs.)

F., 17. When I was a child I had an idea that the sun and the moon were the same body and this body was not so large nor the same color at night as it was in the day time.

F., 19. I used to think that the sun was the golden chariot of God and that He used to ride from east to west in it. The rays of the sun were the lines and the clouds were the horses. (5 yrs.)

F., 19. When about five years old I thought the sun got tired staying in the house the same as I did, and that it liked to take a walk, so that was why it rose every morning.

F., 18. I fancied that the moon had been doing something wrong and the sun was coming after her. As soon as the moon saw the sun coming, she dodged out of sight.

F., 18. I fancied that the sun was a large round ball of fire. My theory was that during darkness it went to sleep and then at dawn it was time for it to get up.

F., 19. I fancied that the sun was a huge lamp which gave light to the earth. I also thought of it as a ball of fire which rolled across the sky.

F., 19. I used to think that the sun rose in the morning because the moon was shining.

F., 17. I thought that there was a big giant who pushed the sun up.

F., 18. I thought that the sun rose out of the earth when it thought it had slept long enough.

F., 18. I have always had the feeling that the sun was a benevolent sort of person who lit up China all night and then hurried up the side of the earth to bring us day.

F., 19. As a child I used to spend my summers at the seashore and used to say at sunrise the mamma sun is getting up to warm the water for the papa sun to take his bath.

F., 18. I thought that the sun was a person who went around the earth to see what people were doing. (9 yrs.)

F., 17. When a child, I looked upon the sun as a very happy man who went to bed and got up just as I did.

F., 18. When I watched the sunrise, I thought of it as a person who was having a hard time to push himself up. I used to think that when the sun rose it was a person getting out of bed and when, on a cloudy day, the sun failed to shine, I thought he was sick.

Points to be especially noted in connection with these fancies and theories of sunrise are the great richness and fecundity of the childish imagination, the constant recurrence of personification and the elaborately constructive character of many of the theories. Many of these are evidently derived from mythological stories, some from nursery tales and the forms of all are doubtless to be explained by the child's environment, but however the form may have been suggested it seems in passing through the alembic of the child's imagination to have taken on an individual character. Closely connected with the reactions of dawn, and in sharp contrast to them, are the reactions to night and darkness with its attendant fears and fancies. The specific questions under this topic were:—

Night. Cases of dread of night in advance or of darkness, with and without special fears; do children huddle and cluster? Give night fancies. Ask what darkness is; its cause.

285 out of 389, or over 73%, report night fears at some period of life and as in other cases the remaining 27% covers the cases which gave no answer to the question. Of fears specifically reported 58 are of ghosts, goblins, witches, phantoms or other supernatural beings, 42 a fear of darkness itself. Other fears reported are of bears, wild animals, indefinite animals, bogie man, Indians, man under the bed, something following or watching, eyes, toads (supposed to be a form of the devil), Zee Zees, something that will hurt, bees (probably an association from the old superstition of telling a death to the bees), and most frequent of all and generally associated with other fears is the feeling that something may seize or grab at one from out the darkness. In addition to the cases given in the return twenty-two adults, none of whom have any intellectual belief in superstitions of any kind, have stated that they still have this feeling on entering a dark room or any closed space. The character of the dread associated with night appears in the following extracts quoted from the returns.

F., 18. Several children have told me that they were afraid of ghosts in the dark and wished it would stay light.

F., 19. I do not dread the night now but I did when a child and was afraid even to go on the veranda after dark. After getting into bed I would get close to my sister. I have often noticed that it is the tendency of children to huddle together when in the dark.

F. The only case of dread of night in advance which I know is a little cousin of mine who is so much afraid of the dark that he begins to fret and worry until the lamp is lighted and the blinds closed.

F., 19. I never had any dread of night in advance but I do not like to be alone in the dark.

F., 18. A feeling of fear and horror comes over me when I go into a very dark place even if it is not night.

F., 19. When I was about twelve years old several houses near us were entered by burglars. For a long time after that I used to feel a dread of night in advance.

F., 19. I used to feel from the time I was about five until I was ten a dread of night in advance. I was always very much afraid of the dark.

F., 19. I have always felt a dread of night or darkness. I think it is mainly because I am afraid in the dark.

F., 18. I used to be afraid of the darkness preceding a storm and had a strained feeling of excitement as well.

F., 18. I have always had this fancy about darkness, that it was something material, something that would strike me if I were not careful.

F., 18. In darkness I always felt depressed, and if it were very black it was hard for me to breathe. It seemed to have a stifling effect upon me.

F., 19. When I was a small child I had a great dread of dark especially if away from home. My dread seemed to consist of a general fear combined with a fear of "somebody." At present my state of mind depends upon my general nervous condition. If excited and nervous I become fearful.

F., 18. I am afraid to go in a dark place even yet. My strength seems to leave me when I walk in a dark place.

F., 17. I imagined that at night evil spirits or fairies would come to the earth and God dropped a black cloud over the earth so that the fairies could not do as much mischief as if it were light.

F., 18. I dread night only in the country. Having always lived in a city it makes me feel lonely at night in the country.

F., 17. I have never dreaded darkness in advance and never heard of any one who did. I have not heard of any child who asked the cause of night.

F., 18. When a child I dreaded to have darkness come but I think it was because I heard so much said about the coming of the end of the world.

F., 19. I have known children to dread night in advance, when they have heard frightful stories, fearing to go to bed alone.

I know a child who imagined that darkness was an animal resembling a cow and though he was repeatedly told that it was not, was never satisfied until the doors leading from his room were closed so that the animal could not enter.

I never dreaded the night before it came but when it did come I was always very much afraid.

I never felt a dread of night in advance but I have often felt a dread of the darkness that precedes a thunder storm.

F., 34. I do not remember any feeling of dread in advance of night. In the dark a feeling of dread came over me. I do not know what I feared. I always prayed and then felt all was well.

M., 19. I do not really dread approaching darkness but I always feel as if I wished it would not come.

As darkness approached I imagined I saw shots filling the air. I saw these shots come but I was puzzled as to where they came from.

F., 18. I never feel nor have felt, to my recollection, the dread of darkness in advance, but during darkness I do not like to be alone.

F., 17. The night out of doors was always a delight to me and I had no fear, but to go into a dark room terrified me. I have overcome this feeling by will power, but I do not like a dark room even now.

F., 21. When a child and up to the age of seventeen years I felt that the worst of all things was darkness. I could not be induced to enter a dark room alone. I feared lest some evil person should seize and murder me. At present I am timid in the dark but that dreadful fear has to a great degree vanished. I have never felt a dread of darkness in advance.

F., 18. I was not afraid of night in advance, but I did fear the dark when it came. I cannot remember that I was afraid of anything but the darkness itself.

F., 18. I have often dreaded the coming of night without any special fears.

F., 19. When I have been alone on the mountains, with night approaching, I have sometimes felt a dread of the dark and a feeling of extreme loneliness and longing for companionship.

F., 16. I have a sister fourteen years old, who though not dreading the approach of night and darkness will scarcely venture into a dark room alone without a light.

F., 19. When very ill for a long time and compelled to lie in bed I dreaded the approach of night for no special reason other than it was dark and did not seem so cheerful even with a bright artificial light.

F., 19. When I was about seven years old I had a fearful dread of going blind. It seemed to me that if I did go blind it would be at night. This feeling did not leave me until I was fifteen.

F., 18. I do not remember of being afraid of the night, but as a child I was afraid of such things as tunnels. I was more afraid just when coming out into the light. I had an awful feeling that I would suddenly be pulled back by some hideous creature.

In answer to the question do children huddle and cluster: there were 220, 56% affirmatives; 43.11% negatives and 116 blanks most of which are ascribed to lack of observation; 115 report that they never had any theory as to the cause of night and darkness, and 53 no night fancies. The thirty-eight white children all made some attempt at answering the question in regard to darkness and its cause. The most characteristic of their answers are here given.

(Age 10 to 12 years.) Darkness is a place where you can not see what you are doing. Darkness is when it gets dark and you cannot see. The world turns round and then it gets dark, (8 children). Darkness is a large black cloud all over the sky, (3 children); when the sun is on the other side of the world, (3 children); when the sky is all black; something you cannot see through; a big black sheet spread over the world; dark that you cannot see; a while after the sun sets and it gets dark; the earth getting real black; when the sun goes down and makes the earth so that you cannot see, (2 children); when you see nothing but black.

Some of the theories given as reminiscences are more elaborate and contain a larger element of fancy.

F., 19. As a child I had two theories about the dark, one that it was a black cloud and the other a veil.

F., 19. From the time when I was four or five years old I imagined that night came in the form of a large man who wore a cap and gown. He seemed to fly by means of his sleeves outstretched. To this day this idea is uppermost.

F., 18. I used to think the dark was a great giant with his upper part gray and the lower part black. As he flew over the earth with outstretched arms the twilight came first and then the black part of his garments covered the sky.

F., 19. I used to think that the darkness was a great strong person who succeeded in overcoming everything but the sun.

F., 19. I imagined that the sun gave all the light and when that was swallowed by the earth, it became dark.

F., 19. I remember when about eight years old saying that the sun was mad at us and went away to leave us in darkness for awhile.

F., 18. When a child I was very anxious to know what the dark was and how it came, also who made it grow dark.

I thought that the darkness was a big black curtain which God drew over the sky.

F., 17. I have never had any fancies or offered any explanations about the making of night except to think that something was dropped over the world so that we could not see through.

I imagined that night was the moving of the clouds which went towards the west and they were so thick every evening when the sun went to guard his treasures it was forced to go behind the clouds and thus cause the darkness to prevail.

F., 18. Darkness seems a great black sheet dropped from heaven to shut out all light.

F., 20. I regarded the darkness as a monster of immense size. I thought he spilt a bottle of ink over the world to cause night.

F., 17. Darkness is a thick veil drawn over the sun so that the light is obscured.

F., 17. I fancied that night was an immense goddess with a black dress studded with stars and a moon which she spread over the sky.

F., 20. The cause of darkness was that God blew out the great lamp.

F., 18. I often thought what made it dark but supposed God did it and I was not to know.

F., 18. As a child and even now I have a feeling that something is lying in wait in the dark to spring upon me.

M., 22. When a small child I had the following theory in regard to night. I thought that somewhere there was a huge house kept by one man. In this house were a great number of wheels one-half black, the other white. When this man wanted night he gathered in the white wheels one by one and threw out the dark wheels. While he was doing this it was twilight. Midnight was when every black wheel was out and every white wheel was in. Day was produced in a similar way by the white wheels.

F., 19. When about five or six years old I always felt as though the dark were a person who was afraid of the sun and came after the sun had entirely gone away.

F., 19. About the age of nine I remember asking if the dark was n't a great black curtain let down from heaven.

F., 18. I thought that a celestial being had large wings and when he spread them out it caused darkness.

M., 18. I dreaded the night when I was a child. I had a fear of something, not ghosts or anything of that kind, but something.

F., 19. When a child I thought night was a black curtain.

F., 18. I used to think that God had a big black rag and covered up the sun and that the stars were little gold dots on it.

F., 18. When I was about nine years old I thought that a great many dark clouds were in the sky and that the moon and stars were lights in little holes—towns in the sky.

During an eclipse not long ago I felt restless and wished for it to be over.

F., 17. The only explanation I ever had for night was that the sun had gone to bed and all the curtains were pulled down while the moon and stars were small holes in the curtain.

F., 18. I have fancied darkness as something soft and soothing.

F., 18. I used to, when about eight, think the night some great monster who had conquered the day.

M., 19. I thought night came because the fuel of the big fire (the sun) had all been burned.

F., 18. As a child I thought that darkness was caused by the letting down of a spangled curtain.

F., 18. I once heard a little girl say that at night God put something big and black in front of the sun to make little girls sleep.

F., 18. I fancied that darkness was caused by the putting out of the lamp or ball of light as I called the sun.

F., 19. I used to think of night as another little girl. It was night when she slept and day when she awoke.

F., 24. When a child of seven I thought that we had light clouds in the day and dark at night and that some one had to change them. I never went so far as to think how it was done.

F., 17. I thought that the night was a big blanket which God drew over the sky and that the stars were holes. I outgrew this fancy when about seven years old.

F., 20. Night always pleased me more than any part of the day, especially when out of doors. But a dark room frightened me if I were alone.

F., 17. I have often thought of night as a dark cloud slowly descending upon the earth.

F., 18. When about four or five years old I used to think that night was caused by some one shutting a huge door in the sky and thus shutting out the light. I thought that the stars were angels' lanterns.

F., 18. I always pictured night as a beautiful woman wrapped in a long black floating robe, with a pure Madonna-like face.

F., 19. I was always very much afraid of the dark until I was about fourteen years old and whenever I went into a dark room it always seemed full of unnatural things. But it always seemed to me that these things were afraid of the sun and would go away as soon as the sun came.

F., 19. I felt that the sun was my friend and that when it came up nothing could hurt me, *i. e.*, the monster I always associated with the dark.

F., 17. If awake before light I imagined that something was in the darkness which would catch and kill me.

F., 23. Darkness to me was always something which was out of doors. I never questioned the cause.

F. I have always had a dread of being alone in the dark. Have not dreaded supernatural things but have the feeling that people might surprise me. If I am in the house with people am quite willing to go from room to room without a light but if alone in the house dislike exceedingly to go into a dark room. I have no special night fancies but if awake, I find myself listening intently for something. Darkness is to me just darkness, never asked about it, never thought of a cause for it. It always came *down* upon me.

A trained nurse reports the case of a child eleven months old which for a number of nights in succession cried as if frightened every time he awoke in the dark but ceased crying instantly as soon as the light was turned on. Three cases of night fears in adults are also reported, in which the patients stated that there was no fear of any special thing but the darkness seemed unbearable.

In contrasting the reactions of light and darkness under these two topics, it appears that a large percentage of those

answering the syllabus have, at some period of life, experienced feelings of fear and depression in connection with darkness and that the type of fancy which predominates through all its varied expressions is of a gloomy character. At the coming of dawn all these night phantoms vanish, the depression is relieved and the imagination reverts to bright, cheerful and hopeful images.

Dr. Anagnos of the Perkins Institution in South Boston furnishes the following interesting data in regard to the reactions of blind children.

"When night is closing and day beginning,<sup>1</sup> A. *feels* it in the air, through vibrations, in the warmer weather but especially in the early spring, whereby she tells the exact time of the morning—whether four or five o'clock—and seldom fails. She is sure that this is no thermal effect for it is irrespective of the sun's shining. It is a feeling that night has passed and a sense of freshness which tells that the day has dawned.

B. has a feeling of pleasure at dawn but is not sure that it is independent of thermal effects, as she has a stronger sensation of pleasure when the sun shines than on a dull day.

C. feels a strong desire for the dawn but thinks it is for action rather than for the coming of the light.

"Blind children share in the fears and superstitions common to seeing children, and often they have special fears, frequently of their own invention and groundless. They betray their fears as seeing children do by covering their heads. They dread the night and are inclined to huddle together and cluster; they do not want to go about alone but seek companions as seeing children do. C. thinks that stillness and loneliness may enter as largely into these childish fears as the darkness does, and this idea is borne out by the following statement of one of the pupils:—

"I do not mind going about in the dark; but I do mind being left alone,—not that I am afraid; but because it is so still and death-like. I should not want to walk about in the night."

The phenomena of dawn to a mind refreshed by sleep starts such a highly variegated wealth of imagery and seems in so many respects to symbolize the waking of the mind itself, that it seems a calamity for childhood and youth not to have had this experience, when the whole world of sight is daily recreated. Very interesting are the returns which conceive the sun as making an effort to lift itself, to get free from the horizon, disentangle itself from the trees, break loose from the sea, as angry at the clouds and pushing them away or breaking through as a victor in a contest with them or with darkness. This psychosis is best after the childish stage when the sun is completely personified as getting out of bed, pulled or pushed upward by some alien power or person, rising like a balloon or on wings, started up by a cannon, being God's eye, God himself or his lamp, a hole in the sky or a chariot with the rays as lines and the clouds as horses. It is striking to notice how

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<sup>1</sup>A., B. and C. are blind teachers.

in many of these fancies the child has no doubt immediately appropriated and adopted as its own, from floating suggestions from classical or adult conceptions, but the fact that a suggestion so subtle that it cannot be traced suffices to establish these images vitally in the mind, when so much that we teach in school with such painful elaboration is lost, shows an affinity or a pre-established harmony between the ancient adult and the modern childish mind. Just here lies perhaps the solution of the very important question whether these dim traces or germinal apperception organs should be brought out, or whether they should be refused any nutriment of myth or hint to accelerate their complete decadence in the soul to make room for more scientific ideas of cosmology. Without entering upon this question here in detail, it may be said that no doubt the law of rudimentary organs generally has its place here, which is that they should be developed at their proper stage in order to be subordinated later like a tadpole's tail. Certainly, if we are to live out our lives completely, this is necessary.

The sun to Aristotle was divine, because it had like the other planets the mysterious power of self movement. This seems most triumphant in the early hour when its movement is vertically upward against gravity. To children as to primitive man, the sun, like the moon, is a wanderer at its own free will. It floats or rolls along wherever it wishes; rises when it feels disposed to do so; and often goes now fast, now slow. There is no idea of a fixed orbit, time or rate. The whole scenery of dawn is a sprouting garden of the most variegated fancies of which no doubt the answers to our questionnaires give but a few species of the forms that really exist in such profusion. The machines that make it go or rise; the dark and light wheels that are put out and taken in alternately; the shadowy beings that hover with gray and dark vestments; in all this the soul seems to go out to nature as on few other occasions and toward few other objects. Some draw the breath with relief when the sun really gets clear of the horizon. They feel in bondage until light comes to set them free, but a touch more of fancy would give them the sun of Heraclitus, daily secreted out of the body of the world, leaving it a little colder and darker throughout its mass, a little more like a corpse. The stimulus of this as a mere sense picture to be gazed at for its beauty, sublimity, glory or joy is great. In these returns are exemplified all stages of degeneration and decay. Geography generally marks the advent of the blighting effects of science upon the imagination. The intellect has caught the sun in its net; given it a fixed treadmill path to travel so that it is no longer the Ulysses-like wanderer; appointed it to definite times; has explained the wondrous colors



and forms in prosaic terms of condensation and refraction; banished Phœbus to the kindergarten or to oblivion. We must regard these returns as the flotsam and jetsam or the fragmentary wreckage of an old world of fancy and feeling. As the polar ice cap is a relic of the glacial age that once covered half the hemisphere, so these are mere vestiges of adult systems of views which are relegated to an ever earlier childhood and made ever more ineffectual and incomplete. The question will recur, however, whether it is not possible and even desirable to keep both the poetic and the scientific standpoints in souls large enough so that each can have its own complete development without interfering with that of the other. That this is to be possible and how, is one of the functions of the new psychology, when its studies of feeling are still further advanced, to show.

Fears, that dawn will not come, in children are due first, of course, to the fact of wakefulness and loneliness with nothing of interest to occupy vacant minds. Nothing stretches time like watching its mere lapse. Again children have developed no very definite ideas of objective time. Only the adult, and he by no means accurately, carried anything like an image of, *e. g.*, that unit of time which modern chronology has fixed as an hour. Thus they have no standard to measure by save their own feelings. Again, most children have slept most of all the nights of their lives, so that for them it is impossible to have any realizing sense of how long the night really is. In sound sleep, which is unconscious, the child has almost no sense of time, and even for the adult, as modern studies show, it is hard to tell on waking how long one has slept with any approximation from subjective bases alone. The night joins on to the next morning with a very obscure and seemingly very brief interval to the healthful child. The first wakeful night, at whatever age it occurs, brings a new sense of the duration of night. This cause, of itself, quite apart from the images which often fill the dark and which are very likely painful, contributes to the "will-it-never-come" feeling about dawn. To fill time is to kill time, and *ennui* makes the desert stretches which insomnia knows so well. Especially when experiences greatly desired are ahead and barred from us by a vacuous interval which the mind abhors, there is a painful protensive experience that makes waiting under any conditions hard, sometimes almost to the point of causing irritability or even anger. The present *must* be escaped, but it lingers on, arid, desolate and interminable.

Another element here to be considered is that in darkness when the soul has in effect lost its highest sense, sight, if not well on the way toward sleep, attention is strongly and per-

haps painfully focused upon the sense of hearing, as with the blind. Again, perhaps the content of the mind consists of the spent, positive after images of the events of the recent past which are ground over to the point of tedium, or else with sleeplessness nearer morning the mental activity is more spontaneous, and instead of being reminiscent turns to the future, and reverie and day dreaming may for a time relieve the monotony. But the youthful mind cannot long work normally or healthfully when cut loose from sense and motion and left to itself. Whatever we may think of the Lockean view that all the contents of the mind come through the senses, the childish mind is very dependent on afferent impressions. When impressions are being poured into it from all sources from the external world, and when the muscles are in their natural state of tension and activity, then alone is the youthful mind normal and growing. Without these, both its work and its images soon become unreal, tenuous and falsetto, and youth instinctively seeks escape from this kind of experience and, like Ajax, it prays for light for which it has a veritable hunger. This is quite apart from the images conjured up by dreams which, faint as they are compared to waking states, are very real in the dark, and is also independent of all the reverberations in the soul of the individual of the horrors experienced by ancestral organisms in the dark, which often veiled the danger that it brought. For to the child, especially, darkness kills motion, and his very nature is activity.

What shall be said of the many children who apparently have never had these fancies? Have they really existed but been semi-unconscious and forgotten; are these the minds that are born short, obscured and clouded to the dawn, dull or less sensitive than others? The data give no hint toward an answer. Some explanatory power, however, may lie in the following consideration.

Many children are born very young in body or again in mind, and never attain full maturity or at least never pass through, however long they live, the last stages of senescence. Many facts lead us to suspect that such cases are more common in offspring of parents somewhat too young for most effective child bearing. On the other hand, perhaps offspring of those a little too old have but little or a very abbreviated infancy, childhood or youth, mature early and show early symptoms of old age. Perhaps none of us live out fully all the stages, young and old, of our lives. For some its early, and in others its later phenomena predominate. Those with few rudimentary mental organs, on this hypothesis, partially omit the childish stages, and

those whose minds abound in them repeat more fully the earlier psychic stages of life.

Again, some live mainly in the intellect, and in some sentiment predominates, and this temperamental difference may explain something here.

But a third view remains, viz.: the reactions called for or obtained in this questionnaire are probably but very few of all those evoked by the phenomena. Perhaps had they been so shaped as to evoke others, minds that gave no reactions would have been eloquent with them. But, on the whole, a child familiar with sunrise, who has never thought how it got up, what it does or where it goes at night, what it is, but has merely accepted the phenomena with no queries and with no rank growth of suggestions, certainly does seem to represent an inferior and somewhat animal stage.

Once more, we believe, such problems as are here suggested in profusion, viz.: what is involved in longing for light and dawn, its many causes, the psychic analysis of the phenomena, how it affects feeling, the typical fancies generated in the mind, etc., are all real and large, if somewhat new problems for the psychologist, and if instead of being conventional and restricted to the few hackneyed themes of the past, psychology is to be adequate to the whole experience of the race and not provincial, these must be considered. To many, these problems seem unreal; in fact, they are as real as anything in the field of mind. They challenge the investigator and cry out for explanation. Their solution is indispensable for self knowledge or for showing the source of mind as we know it.

Again, they give æsthetics a broader foundation and have a great if as yet not defined or prescribable significance for education. Spontaneous reactions of the heart, will and mind to nature in general seem to us the very best and most stimulating of all themes, richest in hints of a larger range and meaning of psychology, and full of budding new explanations of man's inner life.

*The Sun's Rays.* The question was: How does fancy, either in the child or adult, picture these rays either as they shoot athwart the sky or world near the horizon; are defined in floating dust; pierce crevices in dark spaces; break through clouds? Have these ever been imagined to be spears, arrows, weapons, or the sun a fighter or warrior, and if so, against what? Omens concerning being hit by rays; how are reflected beams from water, bright surfaces, etc., regarded?

The topic, sun's rays, elicited a great number and variety of fancies though the suggestions contained in the topic were largely negatived, only 54, or slightly over 11%, of those answering the syllabus having ever thought of sunbeams as spears or arrows and 176 make the definite statement that the idea had

never occurred to them. Only 32 had ever thought of the sun as a fighter or warrior. Some of the objects to which sun's rays were likened were points of a diamond, sharp and hard (F., 20, used to wonder if they would prick her), long silvery threads shooting forth from the sky, golden reeds, long strips of fire pointed at the ends, streaks of light, some thicker than others, strokes from the hand of an invisible artist, bright points shooting out from a ball of fire, fairies dancing, tiny threads holding the earth to the sun, sprays like water from a fountain, in floating dust, like a machine belt, ministering angels or patient nuns, daggers, a hay barn on fire, long, sharp needles, swords, little missionaries seeking to do good and bringing joy and happiness with them, particles of gold, knives, light from the eye of the All-seeing One, arrows bringing cheer and brightness, tiny rainbows, an electric fountain, streams of gold, each ray having a life of its own, something alive, pillars of light, things of fire, fairy soldier. Other fancies are :

F., 18. I used to think of the sun's rays as sins and close my eyes to make them appear as few as possible.

M., 16. I used to think that they really had life in them.

F., 19. When the sun's rays shoot athwart the sky, they seem to be playing tag with one another. As I watch them in floating dust they seem to be dancing about and changing color or shape.

F., 20. I think of the sun's rays as shafts or beams of light. I have never imagined these rays to be spears, arrows or weapons though I have read stories which represented them as such.

### *Something Tangible.*

F., 18. As a child I used to feel that the rays of the sun were something like cobwebs. I remember how disappointed I was when I tried to break them as I did cobwebs.

F., 20. I thought when quite small that the bright pieces of floating dust were pieces of gold and I would attempt to capture them in my hands.

F., 18. When I was about five years old I never would go near a ray of light for I thought it was a spear and would go through me. I thought the sun was a blind man and was following me.

F., 19. A ray of sunlight illuminating particles of dust always appeared to me, when a child, as a bar, and I often tried to take hold of it and bend or break it.

F., 21. I have repeatedly watched a little boy about two and a half years old try to catch the sunbeams in his hands, groping at them and then opening his hand and looking at it in a wondering way as if he could not understand why he had not caught something.

F., 18. Often during childhood I used to try to grasp the rays of light with my hands.

F., 19. When I was small I used to try to catch the particles of dust. I thought they were drops of gold.

As a child the sun's rays as defined in floating dust had a great attraction for me. I made a great many attempts to grasp them and because I could not had a feeling of something mysterious about them. This subject especially interested me between ages of eight and ten.

F., 18. When about four to six years old I had a never ending desire to catch a sunbeam. I was told about a million times that it was

impossible but I thought it more practical to catch a sunbeam than to catch lightning as I thought Franklin did. At first I tried to catch it in a cigar box, but seeing the sunbeam on the outside of the box I thought I did not do it quick enough and that I must hide and *not let the sunbeam know what I was doing*, so I could take it by surprise. My cousin had among his treasures a box which opened and shut with a spring. One day I placed a chalk mark where the shadow always came. That night I placed the box there with a string over a beam. Next morning I went out and sat in the hay waiting for the sunbeam which at last came, but with deep disappointment I saw it *on*, not *in*, the box. But this did not discourage me. Many times after that I sat and tried to catch them, but seeing that I did not succeed, thought it due to my tools, not the impossibility. The sunbeams in the water also perplexed me. I tried to catch them for the purpose of putting them on land but after seeing how difficult this was, I abandoned it and again turned my attention to the sunbeams on land.

### *Sun's Rays as Something Hard or Sharp.*

F., 18. When from six to ten years old I thought that the rays of light from the sun were spikes and that they protruded from the sun in all directions. I had a kind of fear of these rays, but while I was afraid to put my body in a ray of light, I delighted to hold my hand where a ray would strike it and try to look through my hand.

F., 17. I remember feeling that the sun's rays were spears with which the sun guarded itself in case of attack by an enemy. (8 yrs.)

F., 20. I always imagined the sun rays were like needles and could pass right through you.

F., 17. I have imagined the sun's rays to be spears which pierced the hearts of people who had done wrong.

F., 18. I have imagined the sun's rays to be arrows hurled against sinful people.

F., 18. The sun's rays have always seemed to me like an immense hand held up in warning.

F., 19. Instead of weapons I thought just the opposite, that the sun's rays were something to do me good.

F., 18. I thought to sit in the sun's rays made me good as I fancied they made a halo round my head. (4 or 5 yrs.)

F., 16. As a child I enjoyed sitting so that the rays of the sun fell on me and it seemed as if I was very good then.

### *Sun Drawing Water.*

F., 18. I had heard my mother use the expression "the sun is drawing water," and my theory was that the sun must have a great many pails at the ends of these long rays and in some way when we were not looking he drew them into the sky.

F., 21. I had heard that the rays of light were formed by the sun drawing up water and I thought of them as tubes or pipes through which the sun sucked up the water much the same as we use a straw in drinking soda.

F., 19. When I saw the sun drawing water I always imagined it was taking it up in great sheets.

F., 19. I used to think that the sun was drawing water and the rays were going up from the ocean.

### *Reflected Beams.*

F., 18. When I used to see rays of light reflected from tin pans I thought they were smiling because they were clean.

F., 19. When I was eight years old I used to think that when the sun shone on the water, the water was very cruel to send the sun back again.

F., 17. I thought of the water as being a big looking glass in which not only sun's rays but hues, etc., were reflected.

F., 18. When I saw the light reflected from a bright object I thought that the ray had been broken and taken another direction.

F., 19. As a child I used to wonder what the reflected rays were.

*Sun's Rays as Connections between Sun or Heaven and Earth.*

F., 18. At the age of four or five I used to think that the rays which pointed toward earth were paths to the sun, those rays which pointed upward from the sun were paths to Heaven.

F., 18. When I was four or five years old I fancied that the rays of light were sticks or rather ladders from me to the sun. I have put my hand on a ray coming through the crack and felt disappointed because the ray did not support my hand.

F., 19. When I was nine years old I heard the story of Jack and the bean stalk, and afterwards I always thought that Jack must have used the sunbeams to climb so high.

F., 17. I never thought of the sun's rays as spears or arrows, but I did fancy they were paths leading to Heaven.

F., 18. I never connected the rays of light with the sun as a part of it. I thought they were pathways of the angels and for that reason liked to stand in them.

F., 20. My fancy pictures the sun's rays as golden ladders up to Heaven, especially when the sunbeams pierce the clouds.

F., 18. I used to imagine that the rays of the sun were different strong ropes that held the sun in its place.

F., 19. When a child between four and six I was always happy to get where I could see the rays of light. I thought that they were fairy roads and at times would watch for a long while expecting to see a fairy.

*Animistic Ideas.*

F., 18. I used to watch the small particles of dust moving in the sun's rays and thought that they were cleaning the room, and when the sun got lower and the rays were no longer in the room, I thought that they had carried the dirt away. I used to try to cut them by putting my hand through them.

F., 18. When I was a child I pictured the sun's rays in floating dust and had an idea that the little particles were animals and I was always afraid to go near them.

M., 19. I imagined that the particles of dust floating in the beams of the sun were little insects and that they were playing games with each other.

M., 16. I used to think that the sunbeams were alive.

*Fairies.*

F., 18. I used to imagine that the rays of light were companies of little people each of whom had a certain place to stand. To me it seemed wrong to stand in these rays and thus to disturb the little people. But I loved to stand in the rays, nevertheless, mostly for the fun of seeing them dart back into place again. I have often put my hands in them for the same reason and would try to feel them or feel the place where they were.

M., 17. I formerly imagined that the dust in the sunbeams were fairies.

F., 18. When I was about six or seven I thought that fairies lived in the rays of the sun-light.

*Personification. Physical Attributes.*

The rays of the sun seem like long slender fingers, stretching across the sky or piercing the crevices in some dark place—fingers of mighty strength—when they push the clouds aside and dart downwards toward the earth.

The rays of the sun do not seem to come with the force of a hit but just lightly touch the earth and her productions. They dance lightly and gayly from one object to another.

I used to think the rays of light were God's eyes. I had often heard that God saw every one of our actions and thought he accomplished it by using these rays of light for eyes.

F., 17. When about ten years old the rays of light seemed to be fingers reaching out for things.

As a child I pictured the rays of the sun as being long arms and these arms floated into dark spaces and gathered all the dust out of them.

F., 19. When I was a child I thought that the sun's rays were the long arms of the sun.

F., 16. I thought of the rays as the sun's arms reaching down to steal the water from streams.

F., 18. The rays of the sun, I thought, were his hands to push away the clouds.

F., 18. When a child I thought the rays of light were the fingers of the sun.

*Personification. Mental Attributes.*

F., 19. From the age of five to eight I remember imagining that the rays of the sun were golden threads or, at times, I thought of the rays as long lines of light. I think I was about nine when I thought how generous the sun was. I thought it was not satisfied with giving us light from the ball merely but that it sent out its rays in all directions to give more light.

F., 17. When I was about six years old, I remember asking my mother if the sun was ever selfish with its light. I thought that when everything was bright, the sun was unselfish.

F., 18. When the sun's rays broke through clouds, I felt as if they were striking through in triumph, and this feeling I afterwards found expressed in the Greek myth of Apollo's darts.

F., 17. I have imagined the sun to be a fighter contending with the gloom in miserable houses and with unhappy people.

F., 19. When I saw the sun reflected in the water, I thought that he was looking at himself and smiling. I had been told that it was vanity to look too much in the glass and I thought that the sun was vain.

F., 19. I have often thought of the sunbeams as playing with each other. I have pictured the sun's rays as brooms and as canes as they shoot across the sky. I have thought of them in floating dust as streams of water with fish in them.

F., 17. When I was a child I often used to think of the sun as the mother and of the rays as her children which she had sent out to different homes to cheer poor people.

M. C. I often attempted to catch the sunbeams thinking they were the sun's children who had come down to play with me.

F., 19. I thought of the rays of light as being part of the sun and often said, "the sun is playing peep." I liked to put my hands in the rays and see the shadows cast on the floor.

F., 18. I always thought of the rays of light as great long needles. I thought of the sun as a man having these needles and reaching out and touching the water with them.

F., 21. At the age of seven I had an idea that the sun thrust forth arrows and that it was a person trying to hit me.

F., 19. It seems as if the rays were trying to see what was going on in secret corners, as if they were inquisitive.

The sun rays always seem to me to be trying to push the clouds away and to bring cheer and brightness to the earth.

### *Feeling of Companionship.*

I always looked upon the sun rays as jolly dancing playfellows and always felt that I had company if they were with me.

I used to imagine that a sun ray was a kind of ladder clear up to that wonderful world beyond the skies, and that if I only knew how, I could get there along the ray of light.

The rays of sunlight always made me feel as if I had company.

When I am in a room alone I get in the sunshine because I do not feel so lonely then.

F., 19. As a child I used to sit in the rays of light. It was company for me.

F., 19. I used to like to stand in the rays of the sun and especially to put my feet in them. I felt as if they were trying to warm and amuse me.

F., 19. I never had the idea that the sun shining upon me was any special good luck but I always loved to sit in the sunshine and it seemed to be a friend to me.

F., 19. As a child I always felt happier in the sunshine. It gave me a feeling of warmth and companionship.

F., 18. I liked to sit in the sun because I felt more secure.

### *Reflected Rays.*

F., 18. I had a little theory, when about seven, about reflected rays. I thought the sun itself got into the object and then looked back at me and I used to wonder how the sun got small enough to get in.

F., 18. I used to think when I saw the sun reflected in the water or a bright surface that he was looking at himself and smiling. I thought he was vain.

F., 17. I always thought of the light on the snow as the glistening of precious gems. The sun flitting in the brook reminded me of tiny fairies dancing and flitting about. The light on a smooth surface, as a pan, reminded me of a person smiling.

F., 19. When between five and ten years old I used to think that the sun was smiling at me when I saw it reflected from a bright surface.

F., 19. When I saw the rays of light coming from a tin can or piece of glass I imagined it was smiling on some one in the sky.

F., 18. When four or five years old I used to think the reflected rays were children of the sun.

F., 17. In childhood I always thought that the reflection of light was caused by the object becoming angry and striking back.

F., 19. I always thought that the beams reflected from the water and bright surfaces were evil spirits who wished to hurt the eyes.

F., 19. I always imagined any body of water as being the sun's looking glass.

### *Miscellaneous.*

F., 19. When as a child I sat in a darkened room and the rays of the sun were shining into the room, I have often associated them with



the bright eyes of persons peering through the iron bars of a prison door or windows. I was somewhat afraid of them.

F., 18. Another childish fancy was the rays were God's glasses and He could see all I was doing and knew when I was bad.

F., 18. When I was about eleven years old I thought of the long rays of light as similar to the sticks of an open and shut fan.

F., 20. I think I have always had a feeling of dislike for rays of light because when they appear on the floor I step on them and try to get rid of them. Although I act in this way I am fond of sunshine.

M., 28. The actions of both men and animals prove that light produces activity. I have seen many times whole herds of cattle up and feeding on a bright moonlight night. A farmer in the fall of the year will generally put his cattle in a pen when the moon is full for fear they will break out of their accustomed field and get into his harvest fields. On a dark night they lie down quietly but on moonlight nights they always seem to want to be in mischief. A canary bird from a dark corner of the room placed in the sunlight immediately begins to sing, a parrot to talk. Birds do most of their singing in the morning. Squirrels and woodchucks whistle in the morning.

#### OMENS

Very few omens in regard to either sun or moon were reported, only 21 out of 427 giving examples and 223 stating definitely that they had never heard any. But two of those given refer to the sun, one being expressed in the phrase "Happy the bride the sun shines on," and the other has also reference to a bride though of a different character, being a reference to the superstition, that, if during a marriage ceremony, the rays of the sun fall through the windows in such a way as to form a cross, it is a sign of death.

The omens given in regard to the moon were: seeing the moon over right or left shoulder as sign of good or bad luck; moonlight as a cause of lunacy, and moonlight on new hay or money in the hand as a sign that both will be plentiful for the coming year or month. Moonlight on the hands held over a basin of water was also suggested as a cure for warts. A number of the returns, however, stated that sunshine at the beginning of any undertaking always aroused a feeling of coming success although no definite omen was associated with the feeling.

The ideas in this group though not susceptible to classification by any hard and fast lines, since the ideas of one division overlap and run into those of another do, nevertheless, present certain type characteristics. Animism, personification of both physical and mental attributes, the feeling of companionship, sun's rays as a connection between heaven and earth, or the sun and the earth and the tangibility of the sun's rays are all clearly brought out by the returns. The idea of the sun's rays as something tangible is confined to quite young children, probably under four or five years of age. The present returns give but few data on this point, but in a collection of material derived from 84 children of the lower grades this appears to be

the age limit for this idea. In the same returns it is stated that about one-third of the children under six years of age personify the sun. Some of the feelings attributed to the sun are generosity, selfishness, sorrow, gladness, envy, anger, triumph, curiosity and vanity. Also the sun goes to bed and to sleep, plays hide and seek, takes a walk, grows tired and rests. The sunbeams play with each other and are company to children, they work and the water seems cruel when it sends back the reflected rays. All these fancies are expressed in a great variety of ways though the underlying idea remains the same.

Since Max Müller and Cox<sup>1</sup> traced such a vast body of myths to a solar origin, the rays of the sun are shown to have been the origin of many wonderful legendary weapons. The arrow of William Tell who, as every one now knows, was not an historical person but a solar hero, the darts of the far shooting Apollo, the arrows of Philoctetes and Ulysses, and not only many magic shafts but perhaps the swords of Theseus, Perseus and Siegfried, Arthur's Excalibur, Orlando's Durandel, the Volsungs' good blade Gram, etc., are ascribed to one common origin, viz., the rays of the sun. In an age of war they were interpreted as weapons, or more psychologically the rays of the sun, by their length and power to pierce clouds which are often personified as monsters, and gave the human mind a higher idealization of what spears and arrows could conceivably be and do in an age when the human mind was developing with such momentum that it exhausted the possibility of every phenomenon of nature to build itself larger conceptions. These rays were related to the sun gods as his chief weapon was to a great warrior. Is it not plain that childish fancies of rays like the above lend to the main contention of Cox new support not unlike that so often given to phylogeny by ontogeny? The child is only repeating the history of the Aryan race from which he sprung. What was once the terminal stage of adult development is now seen in children as but faint tentatives just timidly budding before they are nipped by contact with science, which conceives one of its chief functions to be eternal offensive and exterminating war upon superstitions. We discover here the psychic germs from which these greatly elaborated ethnic concepts grew, which poetry and art will ever fondly cherish. More yet, modern childhood is so fecund in fancy that our returns show many suggestions that never have received, but still await elaboration in adult art. Individual returns at random are—the rays are "bars between me and another world;" "ladders for fairies to dance on and go to and from heaven on;" in the water they are "the gleam of a mermaid's shimmering

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<sup>1</sup> See his *Mythology of the Aryan Nations*, Vol. II, p. 96 *et. seq.*

gown;" "a wreath of rays around the round happy face of the sun;" "the sun's long arms reaching out to embrace and warm us;" they "pierce all crevices and pry out darkness as you pry out a stone with a lever." Many make a dust to see the particles float in a ray, blow them, or try perhaps to follow one. The rays plunge into the sea to loosen or open a way from the sun, who sinks into it as they do; they spout out on all sides like jets of a fiery fountain; isolated rays are lonesome; are often feared if it is not known at once where they enter the trees or house, and with one child this quest is a neurosis; clouds are very bold that do not fear them; the dark is many times as big and knows enough to fly at their approach. One thinks the dust separate particles of sunshine dancing; they and the rays die when the sun does; reflected rays are impertinent and rebellious; threads or ropes to hold the sun; tubes to suck up water; paths or ladders to the sky; strokes of an artist's brush, spears, daggers, with power to make good or to punish us if we are bad, full of gold dust; the sun is unselfish to send them out so freely, vain to mirror himself in the water, or cruel to break the rays at its surface, etc.

To science, all these are only rank weeds of ignorance and superstition to be extirpated, or at the best products of bad observation. Rays are only vibrations too small to be seen, following mathematically straight lines and reflected by equal angles of incidence and reflection. The atmosphere of the mind must be purged of all vapor and clouds like the moon. Here is a battle-ground, fully typical of all the rest between the imagination, which is the organ of the heart, and reason which is of the head, between faith and knowledge, religion and science. It is better to learn how fast the rays travel, how many vibrations per second, how much heat the sun emits through them, of how many candle power they are, by what prismatic action the pencil of light is fanned out into chromatic hues, for mathematics and not poetry is the origin of true enlightenment. So some would let the pedagogue loose upon all these abortions of the mythopœic faculty and make the child early ashamed of its creations. But the age of fancy comes first and is no whit less in need of full development in its nascent stage than science in its. Normally the latter develops naturally out of the former and with no opposition, each strengthening the other and each suffering if the other is undeveloped. The cultured adult, if the genius of childhood is not killed in him, reverts to all the delicious dreameries of early days and recognizes in them the seeds of whatever æsthetic appreciation he may be capable of enjoying. We should, therefore, take no less pains to develop youthful reveries in their season than mature insight in its, and above all avoid every hint of opposi-

tion which has no natural place in minds large enough for both. Every phase of this problem will receive ample psychological and pedagogical treatment when psychogenesis and education are better understood.

3. Sunset. State both sentiments and fancies on seeing the sun slowly descend in the west, when its disk first touches anything in the horizon, trees, buildings, rocks, hills. Does it enflame? As it sinks, one half and then the other, does it seem to enter the earth or water, or where does it go for the night; is it put out or absorbed?

The question: "does the sun enflame," was answered in the affirmative by 113 adults and in the negative by 78, the remaining 198 giving no answer. It is evident, however, that in one set of 210 papers the question was taken as literally meaning to set on fire, so that the negative result is not significant and the numerical count of little value though the qualitative results are interesting. The same is true of the other questions formulated under this topic, the mere tabulation being of far less interest than the diversity and quality of the sentiments and fancies expressed. As before the suggestions contained in the topic were not accepted to any great extent, the idea that the sun entered the earth appealing to only 45 while only 34 had ever thought of it as entering the water and but 31 as put out or absorbed. This, however, is by no means a negative result, and but serves to show that the mind accepts only that for which by its natural development—as nearly every paper contained some thought on the subject. 31 thought that the sun went to China for the night, 19 said that it went around the earth, 35 that it went to bed, 19 that it went behind the earth, 30 that it went behind the hills or mountains, 8 that it dropped into an abyss, 12 that it lies on the earth, 12 that it went into the woods, 4 into the clouds, 4 to its home in the clouds and one thought it went into the Sea of Galilee. The sentiments typical at sunset, given in order of their numerical importance are moral and religious aspirations, sadness, loneliness, rest, awe and reverence, quiet and thoughtfulness, peace, gladness, regret, sorrow and longing.

The topics of this group seem to fall into certain lines of division, though in many cases the characteristics of one group infringe upon those of others. The extracts from the questionnaires have accordingly been grouped to show as far as possible the prominent characteristic of each group of reactions. The question "does the sun enflame" elicited some interesting replies and it is to be regretted that the data, which was chiefly reminiscent, give little clue to the ages at which any actual belief in the power of the sun to set fire to objects was held.

*Sun Enflames.*

F., 18. I have often felt that there was a large fire somewhere when I saw the sun set. Everything seemed to be burning up and the sky a sea of fire.

F., 19. As the sun set in the west, I thought as a child that the big fire was almost out and needed more fuel. Another fancy was that it passed around quickly on the under side of the earth and reappeared as the moon.

F., 19. Sometimes I imagined that the setting sun was a great fire but never that it would burn anything. I regarded it as a harmless kind of fire.

F., 19. When the sunset was accompanied by brilliant lighting of the sky, I thought that the angels were building bonfires in Heaven and that they were so big and high that we saw the reflection through the ceiling of the earth (the sky).

F. I always wondered why, when the sun set, it did not set fire to the trees, because it seemed to touch them. Sometimes when the sky grew quite red, I would become quite frightened, for I thought the sun had set the sky on fire and all the world was going to burn.

F., 17. I had always during my childhood an idea that the sun was going to set the sky on fire and burn up the world. Even now a faint uneasiness comes over me when I witness an unusually brilliant sunset.

F., 19. If the rays were very red and were reflected in the sky, giving the sky a beautiful appearance, I often wondered why the trees and houses were not set on fire. At last I came to the conclusion (when I was ten) that the sun would fall to pieces if it set things on fire and then it would not be able to come up and see us the next morning. The reason the sun went down for the night was to make room for the moon and then the moon would go down so that the sun would have room to come up.

F., 17. I have often wondered why the sun did not set fire to things especially if it were very red.

F., 16. I always imagined when the sun set, it was falling from the heavens to the parts under the earth. I was always afraid it would set fire to the whole world.

F., 18. I always imagined that the sun went right down in the ground. When about 5 years old, I remember of seeing a sunset over a woods and I thought as the disk touched the trees it burned them and when it went further down it burnt the trees all up.

F., 19. I used to think of the sun as burning up the trees and houses and I was afraid the fire might spread to our house.

*Personification. Mental Attributes.*

F., 19. When I was a child and saw the sun set, stories of dragons and fairies at once presented themselves to me. I well remember asking my mother whether the sun had gone to guard the treasures of a king or whether it had gone to frighten away the ghosts in China.

When about seven years old it seemed to me that the sun did not go out altogether but turned its dull back to us. The sun always seemed to me to be *some one* and not a thing, even now it seems company.

F., 18. I thought that when the sun went down in the west it was tired.

F., 19. When the sun was very red at sunset, I thought that it was excited and angry.

F., 17. I thought that the sun was sorry to say good night and that when the disc just touched the top of the hill it stopped to say a last good night.

F., 18. I imagined that the sun ran back across the sky when people were asleep.

F., 18. When, as a child, I saw the sun go down behind the trees, I thought that it was hiding and that perhaps when I passed that way it would harm me.

F., 18. When the sun set earlier in winter I thought that it wanted to get into bed and be warm. In summer I thought that it wanted to stay up and not get into its hot bed. I thought that the clouds were its bed covering. (5 or 6 years.)

F., 19. It seemed as if the sun disliked to go and stayed with us as long as possible. I was always sorry when it had to go for I thought that the Chinese would not be good to it.

F., 19. Between my fourth and sixth years, I had the feeling when the sun went down that it was God who had been watching me all day going away to watch other people.

### *Personification. Physical Attributes.*

F., 17. I used to think that the sun went into the sea to sleep. (7 yrs.)

F., 20. On seeing the sun go over the hill top, I supposed that it was putting out the light so that we could go to bed.

F., 19. When I was about nine years old, I always thought that during the day the sun tried to climb a tall tree, and when it reached the top it fell off on account of exhaustion. After it fell from the top of the tree it went behind a hill and thence back to the other side of the sky. I had this notion strongly until about eleven years old.

F., 17. As a child I thought of the sunset as the sun's going to bed and covering himself with a beautiful comfortable.

F., 18. When the sun was setting I used to think of it as a man returning from a long journey. I also thought that the beautiful red coloring was the fire from Santa Claus bake-oven and I often wondered why he baked at night when we always baked in the morning.

F., 19. When I saw the sun set over the water I always waited to see the water splash up in great sprays. When I saw the sun set on land I thought he went into the earth feet first, then body and head and finally his long arms gradually disappeared. These arms were sometimes stretched in all directions above the horizon, sometimes I thought of them as folded close to his side.

F., 18. When the sun set I had the idea that it was a very gorgeous Indian who was walking down the other side of a hill which was at the west of our home.

F., 17. I thought at one time when there was a red sunset, that it was cold down in China and that a fire was being made to warm him and we could see only the top of the blaze.

F., 20. I used to think that the sun went to bed in his house behind the hills.

F., 19. When a child from four to six I thought of the sun as a big man that had been holding his great, big lamp all day for us to see by; now he was tired and going behind the hills to his bed.

### *Where the Sun Goes When it Sets.*

F., 18. I thought that it simply dropped off the earth and I have sometimes stopped to listen for the splash, for it seemed as if it must drop into water. This fancy still persists. I cannot get away from it.

F., 20. The sun at setting seems to me to be going out of two gates. I can almost see them close.

F., 18. As a child I thought that the sun sank into the ocean and wondered how it got lighted up again to rise the next morning.

F., 19. I thought that the sun went into the water and became the moon.

F., 19. I thought that when the sun set, it went into a valley.

M., 19. I have the feeling even yet that the sun descends in a perpendicular line behind the mountains, turns at an angle and finally reappears in the east.

F., 19. Between the ages of ten and thirteen I used to watch the sun as it sank behind the trees and I thought that the soft fleecy clouds absorbed the sun, hence their beautiful coloring.

F., 18. I always imagined that the hills in the distance swallowed the sun when it set.

F., 17. I thought that the earth opened its mouth and swallowed the sun and let it out of the other side of its mouth the next morning.

### *Power that Moves the Sun.*

F. The sun always seemed to me a big round ball that invisible hands were pulling down behind the mountains; they pulled very slowly until the rim touched the mountain and then they gave a quick pull and it was gone.

F., 17. When a child I used to think that God pushed the sun around the heavens.

F., 18. When the sun began to sink in the west, I thought that the God who upheld it was getting tired and that it was the relaxation of his hold that caused it to sink.

F., 18. I had heard people say when the sun was setting that the woodchopper was about to cut off the limb and I wondered if there was something which held the sun up like the limb of a tree.

F., 13. The sun has the same power to rise and set that we have to walk.

M., 18. c. I thought the sun rose and set itself.

F., 19. c. I thought the sun was pulled up and down.

F. It has always seemed to me as if an irresistible force was pulling the sun down as it nears the horizon and that the nearer the sun came to the horizon, the harder it pulled. As a little child, I thought this force was God whom I pictured as a strong old man, and though I no longer think of it in this way, the feeling of something pulling the sun down remains the same.

### *What the Sun is.*

F., 18. When the sun touched the horizon I watched it to see if it would not bounce, as it seemed so light and soft and fluffy like a rubber ball.

F., 19. When a child I used to think the sun was made of glass.

F., 19. I used to think that the ball of fire was cooling off and rolling away when I saw the sun set and disappear from view in the west.

F., 18. I have never had any particular emotions on seeing the sun descend in the west. I have thought of its being a hole in the sky and have watched it glitter.

F., 18. I used to imagine that the sun was soft and indented and absorbed by everything it touched.

M., 16. c. I thought the sun was a big fire that was put out or covered up at night.

In a collection of ideas of children three or four years old, the sun is regarded as a yellow rag, a spot of paint, a round piece of gold, a fire balloon, paper stuck up, a cake of ice, a hot orange, a big lump of gold, a ball of fire, God's eye, a heated cannon ball, a big lot of fire crackers or just a hole with the

light shining through. The idea of motion seems to enter into these earlier ideas in only a very limited degree. Ideas of its distance are also extremely crude, some children, even up to the age of seven or eight, thinking it possible to reach the sun with a long pole or that it actually touches the trees as it sinks below the horizon. Some of the reactions of those older are:—

F., 18. I never see a sunset but that I feel better for having seen it, *i. e.*, I feel that my mind and soul are greatly benefited by seeing the sun slowly descend. I have received as much good from some sunsets as from sermons.

F., 19. At one time I was at the seashore and saw the sun sink in the horizon. I was very much frightened and thought that we should never have any more sun because if it was a ball of fire it would be extinguished when it touched the water.

F., 18. When I see the sun slowly sinking and the wondrous play of colors in the west, it makes me feel as if I would like to make my life fuller, larger, nobler. It sometimes makes me feel a little sad and subdued but peaceful.

F., 19. The rays at sunset always make me think of Heaven. I have had this feeling since I was thirteen.

F., 27. When alone with nature at sunset I, at first, enjoy the stillness which prevails at that time and after that a loneliness creeps over me.

F., 19. To me sunset is the time when I have my best thoughts. I feel in a world by myself. As the sun drops out of sight the element of fancy disappears and sober thoughts and sentiments take its place.

Among the points of interest to be noted in connection with this topic is the tendency of the very young mind to accept things as they appear without any attempt at explanation. This same tendency is noticeable in those of the colored race to whom educational opportunities have come later than to the average child in the northern states, a large proportion of those between the ages of sixteen and twenty-seven, answering the question as to theory of sunrise and sunset before geography was studied, with an unqualified "I never thought about it." The tendency to personification, as in the other topics in regard to the sun, is prominent and appears in a great variety of forms, and the idea of the sun as pushed or pulled by some force outside itself is not only of frequent occurrence in children but adults also testify to the persistence of the feeling and the inability of scientific knowledge to displace it. This separation of an emotional reaction from accompanying intellectual assent is in itself an interesting problem to the psychologist, entering as it does into the whole problem of belief. In the child, apparently, the elements of belief are easily separable, their attitude towards toys and imaginative games seeming to be one in which the intellectual assent is slight and the connection easily broken. The little girl may at the same time lavish her affection on a baby constructed from a shawl, making it her companion by day and night, yet be quite undisturbed by the necessity of an



occasional laundry process and reconstruction of her baby. For this reason it is extremely difficult to discover how far the personifications of children are attended with actual belief. Precisely the same difficulty has been encountered in the study of Indian myths and beliefs. The *Wakanda*<sup>1</sup> of the Western tribes, accepted by the early missionaries as meaning the Great Spirit and embodying a monotheistic idea, is now proven to cover a variety of ideas, the original meaning of the word implying the power of bringing something to pass and also something mysterious, hidden or unseen. In some cases this mysterious power is evidently conceived as similar in its nature to the human will, but among some tribes the word is applied to ceremonial objects and decorations. The character of the sentiments evoked at sunset is also of interest, the predominance of those of a moral and religious nature suggesting that the establishment of the vesper service by the Catholic church was the recognition of a psychological principle, on at least its practical side.

The physical differences between day and night seem exactly reflected and expressed psycho-physiologically in the differences between the waking and the sleeping state. The waking soul is the creature of the sun and instinctively worships its creator. Without light, all things that could live at all would lack all the periodicity that day and night have brought into the world, so that all that submits to this great pulsation is heliotropic or phototropic in yet far more manifold senses and ways than are described in this paper. Most that the waking adds to the sleeping state in all higher creatures is due yet more to light than to heat, for the former is by far the greater diurnal variant, hard though it is always to separate thermal from photic effects. Sentiment no doubt long preceded science in its dim way in recognizing to what an extent we are children of the sun.

It was a bold and brilliant conception of Max Müller that the primitive Aryans, shut in their valleys by high mountains, with no political organization, little literature, science or other cares, with no alien culture to absorb, no education, and intimidated by no criticism, leading a monotonous life with herds and crops so dependent on celestial influences, weather, heat and light, should turn their attention skyward with a fresh and eager curiosity and interest nowhere else paralleled, and vent on the phenomena of dawn, evening, cloud, storm, etc., all the creativeness of the native mental vigor of their race, personifying the phenomena of nature in three thousand deities or

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<sup>1</sup>A. C. Fletcher: *Science*, n. s., 4:476.

<sup>1</sup>W. J. McGee: *Rep. of Bureau of Ethnology*, '93-'94, p. 182.

heroes, giving them names which modern philology shows to be only epithets describing their sensuous effects upon minds and hearts as exquisitely attuned to them all as those of childhood, but with rare power of what Herbart deems the best culture, viz., elaborating their own ideas and working them over and over till the Hellenic mind took up the themes and wrought out a mythology and theology largely based, though unknown to them, upon the direct responses of the soul to the multiform aspects of nature, chief among which were always those of day and night, the sunrise, its progress through the sky, victory over darkness, battling with storm and cloud, and sinking to a glorious death at last. The solar heroes, as every schoolboy knows, are strongest at noon, heroes of many wars, always victorious, glorious in their own beauty and radiance, often golden haired, sometimes with one eye, exposed on the eastern hills in their infancy, slay their parents, have strange fits of gloom, and their death is triumphant transformation scene with resurrection implied. All have some, although perhaps none have all of these traits. Olaf Redbeard, Boabdil the Moor, Fethringer, Elijah in Jewish tradition, St. John of the Apocrypha, and all the great sleepers will awaken in some morning or springtide of the world. They are often strongly subject to alien and inferior powers; Achilles to Agamemnon, Apollo to Admetus, Hercules of the twelve labors to Eurystheus, Cinderella to her mother-in-law, etc., as light is at times subject to darkness. Their far-darting weapons are unerring and pierce all the monstrous dragons of darkness. Many elaborated literary products are translatable back to phrases merely descriptive of these processes, says Müller; *e. g.*, "Selene loves Endymion," means when translated etymologically, the moon loves the setting sun. "The children of Niobe were slain by the arrows of Apollo," merely states that the children of darkness are slain by the rays of the rising sun. The metaphors faded, their poetry fossilized into literal personalities, what happens every day and everywhere was given a place and perhaps a date, poetic genius developed and spiced all with details, the incidents and conflicts were raised to the moral plain and made pregnant with ethical meanings, and natural religion reached its greatest efflorescence only to be superseded by one emanating from the heart of man rather than from the heart of nature.

Before adolescence, personification of the sun has generally ceased, but the old joy of sunrise and the pathos of sunset is now felt more deeply and in a way that never fades. To many a youth its rays seem arms stretched in benediction as it sinks, and there is an echo of the old fear that it may never escape from the sea or overcome the obstacles in its pathway, and rise again, which in modern times is given new but vaguer forms,

but springs from the same psychic roots as did the old traditions. Its conquest of night; its power to put darkness to flight; to drive away old winter with all its luggage; to usher in spring and vegetation, still impresses the heart with a sense of its power as a great conquering king.

How modern poetry lives, moves, and has its being in the same realm as childish fancy, a few almost random quotations, some of which are perhaps not all with literal exactness, will show. "It drank the blood of the sun as he slaughtered sank;" "the sun is a bridegroom, the earth a bride, they court from morn to eventide;" it still shoots its burning lance, kisses the earth its bride, the pale angels of dawn that opens glorious portals and scatter the "wandering ghosts that beat the gates of heaven all night;" the night comes "fold on fold, dulling the western gold;" it "blackens bush and tree;" "draweth night's dim net;" the sun's "footprints leave the sky ruddy;" "like a withered leaf the moon is blown athwart the sky;" the sun "hails down light;" its silhouette is "etched clearly" in the eastern sky; the west is "broken into bars of color" and after sunset there is a "lifeless cloud like a dead angel lying in a shroud with lilies on her breast;" "with light and butterflies the world did seem to flicker and float as though the maker slept and in a dream imagined it;" the sun "weaves a Morris dance" of rays and shadows; "the moon rises wearily with virgin snow;" "darkness takes not sunlight in her snare;" "light and song wash night away;" it is "all a fire flaming heavenward;" "deep bosomed night with sea-scent soothes the liquid heaven;" the sun "dipped its cup" "where the eastern conduits ran red with wine;" the trees "turn old and gray" as the shadows drape them; the "sullen ledge of the clouds cast down;" the moon "swoons;" it is "a golden galleon beating athwart the azure tide" and "hurling shadows into the sea;" now it "ponders with smiling face mild and clear" or "chubby cheeked;" or toils up against the clouds in which it "founders;" at sunrise the "dazzled ether is a glister of diamond wine;" the dark is "washed" with light; Hesper rises "o'er the ashes of the sun;" the sun "beats up" the sky, or falls defeated from the "ominous dim space" and leaves the "stern blue crypt of night." Good thoughts fly to meet the morn; Helios is still a deity arrayed in gorgeous vesture driving a chariot, although the traces of its old dominion over heart and fancy are now more effaced than those of the moon.

To Aristotle the sun was a deity, which in his system must be of pure fire; so that he could not accept the theory of sun spots, which he deemed both absurd and impious. Anytus thought to correct Socrates of atheism he did not think the sun

and moon to be gods, but the latter denied the charge. To the younger Herschel the "willow leaf maculation" of the sun, which is the most minute discernible modification of its surface, was, despite the intense heat, living organisms developing light, heat and electricity, although each individual creature must be at least several hundred miles long. It has often been thought to be hell. Superstitions concerning eclipses still observed among primitive people; the general expectation of a great wind as the moon's shadow at total obscuration sweeps over the earth; the unsteadiness and great fallibility, even by astronomers, in making drawings of the corona during the precious two or three minutes, so laboriously prepared for, before the camera, which has no nerves, lent its aid; the persistent impression that the periodic sun spots influence business, crops, temperature, rainfall, or perhaps caused panics; the persistent weatherlore signs connected with solar phenomena, which Mr. Inwards has collected and tabulated,—all these we interpret as vestiges which show that as the earth, plants, animals, and the human body are in a profound sense children of the sun, the mind is hardly less so; and that as the coal, which runs machinery and warms our dwellings, is the result of solar momentum, so even our psychic activities suggest that brain function is also to some extent a vicissitude of solar energy.

For science the sun is simply a star seven hundred times as large as all its planets and one hundred and ten times the diameter of the earth, so that if the latter were at its center the orbit of the moon would be a little more than half way to its surface. It rotates on the average once in twenty-seven and one-half days. The darkest sun spot is far brighter than calcium light; its heat would melt a glacier fifty feet thick over its entire surface in about one minute; and the earth would soon vaporize if as near it as the moon is to us. It consists of twelve well established elements and as many more nearly proven. Even its hydrogen chromosphere of scarlet flame is from five to ten thousand miles thick outside of the photosphere or reversing layer, while the corona extends so far that it very likely envelops the earth itself. Observatories devoted to its study alone, like those at Potsdam and Meudon, weigh it; calculate that its energy could light and heat twenty-two hundred million worlds like ours, most of which light and heat is lost; seek to tell its story from the time when all energy was gravity; estimate the amount of attraction per century, or the number of meteors falling into it necessary to keep up its heat, calculated to be all the way from ten to fifty thousand degrees C; attempt to determine the probable consistency of its substance; while the popularizers figure out that a cannon ball at the rate of seventeen hundred feet per second would require nine years

to pass from the earth to the sun; that a train going a thousand miles a day would need two hundred and fifty-four and one-fourth years, and that the ticket would cost two and one-half million dollars.

But poets conserve their own youth and that of the race. The two belong together and it is no more possible to tell what childhood owes to their suggestion than what they owe to it. These metaphoric phrases are not elaborated or hardened into mythology much as they may owe to it. Some seem a little strained and artificial, as those of childhood rarely are, but all are outcrops of the same vein. If darkness created sleep, twilight had much to do in the creation of a large class of sentiments and fancies; and has inspired much poetry, and religion and æsthetic feeling. It is not only one of the great mood-makers, but has done much to shape the human soul and given it much, the genesis of which cannot be understood till traced back to its source. Its influence has been almost purely beneficent. The rush of the day is over and the passions and fears that haunt the night are not yet aroused. We are in the tranquility of the golden mean with nerve tension relaxed, all the senses at rest, and motion, effort and work suspended. Its mild melancholy seems of the benign and wholesome kind and perhaps tends to make the soul immune from the acute forms of depression. Its sweet disphoria is the counterpart of the euphoria normal when day breaks upon rested spirits with its wondrous transformation scenes. Civilization has developed evening, the sad end of the day, or artificially prolonged twilight, which has brought added duties to the jaded soul, brought the sadness of study and wisdom and robbed us of the optimistic, upward striving hour of dawn.

Twilight fancies. What sentiments are typical with you when alone with nature between sunset and dark; is there distinct depression, rest, reverie; of what kinds? Does the mind awake as sense rests; are such experiences loved or shunned? Poetic expressions.

Very closely connected with the feelings and sentiments typical at sunset are those of twilight. It is the hour of rest, reverie and introspection, of bodily and mental relaxation. Sentiments given as typical are reverie (152), rest (127), poetic feelings (104), moral and religious aspirations (48), depression (50), regret and sadness (44), peace (27), loneliness (32), happiness (21), awe and solemnity (17), fear (6), restlessness (6), reverence (3), ambition (2), restful sadness (10), and tenderness (2). The twilight hour was loved in 273 cases and shunned in 79 while 32 had no special preference in regard to it. The question, does the mind awake as sense rests, though directly answered by only 114, is very fully brought out in the returns, the character of the mind's activity being well illus-

trated. On this topic there is a difference between returns from the white and colored races. The pleasure taken in twilight by the former is in all cases of an intellectual or emotional character while in the latter dusk is liked because it is cool, pleasant, study or work is over, etc., while the question, What do you think about in the dusk? was answered in the majority of cases by "nothing special," "do not have any special thoughts," "think about supper time" and "bed time." There is also dislike of being alone in contrast to a preference for it on the part of the whites answering the question. 80% of the colored returns expressed this feeling, which was rare in the other returns. It would, however, be unfair to infer complete absence of poetic feeling inspired by sunset and twilight in the colored race, as the apparent lack may be due in part, at least, to limited power of expression rather than the absence of the feeling itself.

Of 312 whites 104 stated that they either felt like writing poetry or recalled poems or poetic expressions which had been read, 57 that they did neither, while 151 gave no direct answer to the question. A part of this last group, however, gave evidence of poetic feeling in their attitude toward nature and sentiments expressed in regard to sunset, twilight and dawn. 44 expressed a desire for music at this time, usually for that of a subdued, dreamy character. Evening hymns were a favorite method of expression and in instrumental music the preference was for that which expressed the sentiments typical for the twilight hour. A few gave lists of their favorite hymns and poems in connection with twilight. Those occurring most frequently in the lists were: Lead Kindly Light, Now the Day is Over, Ave Maria, Longfellow's Twilight, and The Day is Done, The Lost Chord, Crossing the Bar, Twilight is Stealing over the Sea, and Gray's Elegy. The similarity of the lists is doubtless due to the fact that most of the poems mentioned had probably become familiar in the school curriculum. The sentiments typical at twilight are fully illustrated in the following extracts.

#### *Moral and Religious Sentiments.*

F., 20. When alone with nature between sunset and dark all that is good and holy in me seems to stand out very clearly.

F., 20. When alone with nature between twilight and dark I always feel nearer God. There seems to be a hush over the earth as if it were receiving an evening benediction.

F., 19. God and heaven seem nearer to me then than at any other time.

F., 20. I think that I will be a more dutiful daughter and will always try to be to my brother all that an older and only sister should be.

F., 19. My thoughts at twilight turn to the Creator of beautiful nature, and a calm and quiet feeling takes possession of me. A distinct feeling of rest and peace comes over me.

F., 23. I feel the goodness, greatness and power of God, and I also feel as if I wished my life to be better and nobler.

F., 18. When alone in the twilight I feel a great love for all things, I have a feeling of satisfaction with myself and the world at large. My mind becomes more actual, in that I can imagine constructively with greater vividness than at other times.

F., 18. When alone in the twilight, from a child, I always had a desire to be better. I never felt like laughing or talking. I always felt the solemn feeling pass away when the lights came.

F., 17. Twilight is apt to make me think seriously about right and wrong.

F., 20. I feel more than at any other time a divine or higher power something which fills me with awe and satisfaction.

F., 17. I think such experiences make me better. They seem to bring up my best feelings.

F. I always long to do something good, something for the cause of humanity. My love goes out to everybody and everything at this time. I have had this feeling since I was a child.

F., 18. I think that at twilight there is a tendency to moralize in a dreamy way.

F., 25. When alone with nature at twilight I often have a feeling of peace and solemnity with a strong sense of protection and a love for all nature. Sometimes I have a realization of a grand, noble purpose for everything and long to do something.

F., 19. When alone in the twilight an overwhelming sense of all that is good comes over me. I like to be alone at that time.

F., 18. I always feel ambitious and as though I ought to be better and do some good in the world.

F., 18. I always have a desire for music at twilight and try to compose something myself, not to play the old things. As a child, my twilight mood was disagreeable to me, now it is the best mood of the day.

F., 17. I like to listen to music that is soft and low.

F., 18. Twilight seems to be a time when we can tell our most secret thoughts.

F., 19. My greatest desire is to sing, to sing something soft, low and sentimental. The slightest noise disturbs me and makes me irritable. To me this is the best time of the whole day.

F., 20. When alone with nature between sunset and dark a feeling of reverie steals over me. Rather a peaceful feeling takes possession of me. My mind seems very active and my thoughts are usually pleasant.

F., 19. I do not feel depressed between sunset and dark, on the contrary, I feel happy and rested although solemn.

F., 18. When alone with nature in the twilight my habitual feelings are those of depression but though I feel depressed I rather like the mood.

F., 18. When alone at twilight I like to play the piano or sit and dream.

F., 20. If I have been depressed during the day the feeling is increased by twilight, but if, on the other hand, the experiences of the day have been pleasant ones I like to dream about them.

F., 17. At this time of day I feel rested, refreshed, and very light hearted and gay. I enjoy telling comical stories and jokes and this is the time when I usually tell most of them.

F., 19. I never feel depressed at twilight. I rather welcome it. It was then I allowed my imagination to work. Sometime my poetic feelings would be aroused and I would muse over various beautiful thoughts and sayings about nature which I had either heard or read.

F., 16. When I have to study in the evening, I do not indulge in my twilight mood because it renders me physically unfit for my work. I dream and dream when I am playing and see and hear the most beautiful shapes and sounds. The desire to put all the sounds I hear into music that I can play is so great that if I do not succeed I am exhausted for the rest of the evening.

F., 18. In spite of the fact that I enjoy the feeling of rest and reverie at twilight I know it is anything but good for me. My will power is not strong enough to keep my mind from reverting to those things, if I have spent much time with them, long after twilight is past and study hour begun.

F., 17. At twilight I always have a feeling of rest and reverie. I like to sit perfectly quiet and think about nothing special but just let my mind wander from one thing to another. At this time of day I often sit at the piano and play a dreamy piece of music very softly. I am very fond of the twilight mood.

F., 18. When I was very young there was no difference between twilight and daytime for me. The only way I ever noticed it was that I would go into the house instead of out doors to play. Later, when about ten years old, I became very poetic in twilight, so much so that I once composed a poem, very bad poetry of course. At present I day dream and plan during the twilight. I love it.

F., 19. When alone with nature at twilight I have a feeling of restfulness and reverie. I can not remember this feeling as a child. It has only impressed itself upon me since the age of 13.

F., 18. In twilight my mood is one of rest and reverie. I like this twilight mood. It is then that I feel many things that I cannot put into words. I often long to know some beautiful piece of poetry which would express my feelings. Then, too, I wish to sing something strangely wild and beautiful. I desire something weird and sad never anything like the common fast pieces of to-day. I am disappointed for I can do neither of these things.

### *Miscellaneous.*

F., 18. I never had any twilight fancies.

F., 19. It always seemed to me that twilight was the time for all sorts of ghosts and goblins to be prowling around and I have often fancied that I saw them and would be afraid.

F., 18. Twilight stimulates me to physical activity. My spirits are highest at that time.

F., 21. The only feelings that I ever had at twilight are those of loneliness and fear.

F., 17. It is a time when you fancy you see a great many things.

F., 21. c. Yes I want the lamp lighted because I am afraid of the ghost.

### *Mind Active as Sense Rests.*

F., 18. I do have a feeling that my mind becomes more active at this time for I feel more like studying my lessons and can remember them better than at other times.

F., 20. When I am alone at twilight I have a feeling of intense longing, for what I do not know. I have had this feeling since I was about twelve. My mind does not become more active. I am inclined to wander about on many subjects. At twilight I love to talk of things which seem impossible to talk about in broad daylight.

F., 19. When alone with nature at twilight a decided feeling of restfulness comes over me. My mind seems to awake as sense rests



and the feeling is so delightful to me that I am reluctant to have the lights lighted.

F., 17. When the light goes away I feel I can devote this time to day dreaming and my mind becomes more active along this line. It seems as if it would not work along other lines then.

F., 18. My mind is duller at twilight than at any other time.

F., 19. I always have a dreamy feeling and never feel like doing exact thinking. I feel a lessening of my mental powers at that time.

F., 19. In the twilight my mind is quite active in one sense. I usually dream over many things and that is the time I pick myself to pieces.

F., 19. When I am alone in the twilight I have a feeling of utter loneliness. My mind becomes stagnant. I feel as if I could never concentrate my thoughts.

F., 19. As the light goes away I can dream better but not think better about lessons.

F., 19. At this time my mind becomes sluggish.

### *Twilight Loved or Shunned.*

F., 19. At twilight I usually have a depressed mood if I am compelled to remain inactive. If I can take a walk, play the piano or do something else, I can rid myself of this depressed feeling to some extent. I often wish there were no twilight as my twilight mood is very disagreeable to me.

F., 17. Between the ages of four and twelve I always had a feeling of fear when alone with nature in the twilight. It seemed when a tree was dark it was a goblin and would harm me or when the leaves rustled in the breeze that some one was running after me and would catch me. Now I enjoy the twilight.

F., 18. I like very much to be alone with nature between sunset and dark. There seems to be rest at that time. The beauties of nature pass through my mind, I love to be out at this time and during the summer always look forward to going to a pond near my home to watch the sunset.

F., 19. As a child I think I did not like twilight. At this period of the day I was restless and my mind seemed more active. The reverse is the case now.

F., 19. I always love such experiences, never shun them. I enjoy this part of the day more than I do any other part of it. I often think of poetry and poetic expressions.

M., 19. As a child I was always restless during the twilight and longed for the lamp to be lit. Now I usually have a feeling of restfulness and a mood of reflection. I enjoy the twilight though not as much as sunrise and sunset.

M., 18. When a child the twilight gave me an uncomfortable feeling. Now I enjoy the twilight.

F., 20. I never liked and do not like now the twilight hour. A feeling of depression and foreboding comes over me but as soon as the lights are on the burden is lifted.

F., 18. When I was a little child I did not like the twilight and used to cry for a light.

M., 18. When a child I used to be afraid of the twilight. I wanted to get inside a house and stay there. I was afraid of animals especially dogs. I was afraid a dog would bite me. At the present time I hate twilight, it makes me feel so sleepy. It does not stimulate me to poetic expression.

F., 19. I have never liked twilight. As far back as I can remember I always wished the lights to be lit as soon as it began to get dark. I

never like to be alone with nature in the twilight. I never felt that I could see better in the dusk nor was I moved to poetic expression.

F., 17. If I was left alone in the twilight when a child I was afraid. I imagined I saw things stealing stealthily toward me. Now it is my most pleasant time. It never stimulated my poetic sense because I have n't any.

F., 19. When I was a child, from about the age of five till twelve, I loved the twilight and looked forward to it every night because my sister would play for us and my brother and I would sing till the lights were lit.

F., 19. I love the twilight now but when I was a child I did not like it. From about six to thirteen I disliked it.

I love to sit in the twilight and listen to music or play the piano.

F., 18. Between sunset and dark I usually feel sad, sometimes I dream of the future. I have no distinct depression. I do not think that the mind awakes as sense rests. I shun such experiences.

F., 18. When from four to six years old I never would be alone in the twilight but now I love to dream in the twilight.

F., 17. When a child I used to like to go off and sit on a log and think of all the beautiful things about me and about what I would do when I grew up.

F., 18. When a child I did not like the twilight. It seemed to make me discontented. At my present age I rather like the twilight.

F., 17. To me twilight is the best hour of the day and I long for its coming.

F., 17. When a child, up to age of thirteen, I did not like the twilight now I love the twilight.

F., 18. I love to sit in the twilight alone and listen to music or play the piano.

F., 19. I love the twilight out of doors but when in the house do not like it at all.

F., 18. I never used to love the twilight but I do now.

The reactions of the blind are contained in the following notes from Dr. Anagnos.

"With the children twilight is welcomed as the beginning of a period of rest after a busy day.

All three teachers find the twilight hour, when alone with nature, pleasurable and conducive to reverie; they feel no depression but, rather, a sense of awe. C. thinks the mind does not awake as the body rests; A. says there is no relaxation and that the experience is not peculiarly restful. B. finds it restful.

"A. thinks that pleasure in descriptions of sunrise and sunset depends upon one's appreciation of beauty of diction and upon one's innate love of the beautiful and delight in being in it or surrounded by it. 'The best of sight is in the brain.'"

In connection with these returns, the influence of twilight as a factor in moral and æsthetic development becomes an interesting topic. How far are these moods of introspection and reverie normal and healthful? Are they good for all or are there temperamental differences which make it desirable to exclude in one case what is distinctly developmental in another. There is undoubtedly a lowering of tension in the mental as

well as in the physical faculties and the sentiments and fancies are attuned to a minor key. That this mood, even when tinged with sadness, is enjoyable is certified in many instances and in the minds of most of the writers there seems little doubt as to its beneficial effects morally. A few, however, recognize that there may be danger as well as charm in a too frequent indulgence in a mental state in which vigorous thinking and the supremacy of the will are in abeyance. It is a mood of mental and physical relaxation, the hour which invites confidences and emotional states are in ascendency. To the homesick girl twilight is a time to be shunned. There is, too, in some of the papers, a note of fear and depression as if the shadow of coming darkness producing a lowering of the mental tone. This is especially noticeable in children and in the returns from colored students, and is not usually associated with any particular fears or superstitions. Does it point backward to an ancestral origin? The marked predominance of moral and religious aspirations in the sentiments given as typical for twilight seems to indicate that the influence of the twilight reverie may be an important one in moral development but the data do not clearly show whether these emotional states are those which later enter into the practical life and find their expression in action or whether they partake of the character of the small boy's reflections, who asserted that he had the blues every night on account of his badness during the day, but always slept them off before the next morning. Noble emotions nobly expressed in action mean moral growth but a dreamy moralizing, which finds no issue in voluntary activity, tends rather to an obliteration of the moral consciousness and to a lessening of the capacity for vigorous mental effort.

In reviewing the fancies, theories, sentiments and feelings of childhood toward the dawn and darkness, sunrise, sun's rays, sunset and twilight we find running through them certain lines of classification. The ideas themselves may be derived from many sources, many of them are of mythologic origin, some have their seat in folk tales and nursery lore, while others, though hardly to be classed as scientific, are evidently resultant from early introduction to science; some can be traced to no origin found in immediate environment. But whatever the source, the child's mind accepts only what appeals to it in that particular stage of development in which it happens to be. Mere presentation of a suggestion does not insure its acceptance, while that which is in harmony with the mental activities is readily assimilated and undergoes in the child's mind whatever transformation may be needed to suit it to his own special purposes. The constructive character of many of these sun fancies is of especial interest. In all the attempts which have been made to force

modern ideas of civilization and religion upon primitive peoples, has not precisely this same psychological fact been the stumbling block in the path of the missionary and would be teacher? Does not the study of the child's mind furnish us with pregnant suggestions for the study of the primitive mind? A comparison of the ideas set forth in the present returns with some of the ideas common to the myths of the North American Indian tribes, many of whose myths and traditions are of solar origin, presents some points which are of interest. Summarizing as briefly as possible, the ideas contained in the various topics, we find that under all the varied theories of sunrise lie two fundamental ideas: it is pushed or pulled up by some power outside itself, or it moves by its own power. The external power may be God, the clouds, light, heat or some unknown force, the power within may be of any sort, from an imaginary clock work to a complete personification including both physical and mental attributes. Dawn and darkness may be personified as themselves entities if they may be regarded as attributes of the sun. Sun rays may be children of the sun or they may be his fingers, arms or eyes, they may push away the clouds or reach down to steal the water from streams and ponds. The sun is selfish or generous, angry or pleased, sorrowful or smiling, vain, envious or triumphant. His rays may be imagined as something tangible or paths leading from earth to heaven, or they may be regarded as having life in them and bringing a feeling of companionship. Love of light and dread of darkness are characteristic. Things joyous, bright, beautiful and hopeful are associated with the beneficent powers of dawn, thoughts of dread, depression, gloom and a general lowering of the activities belong to night and darkness.

In classifying Indian myths Major Powell<sup>1</sup> distinguishes four stages in the growth of mythic philosophy. To the first of these he gives the name of hecastotheism, the stage in which supernatural powers are attributed to both animate and inanimate objects, an all pervading animism which answered the questions of how and why to the savage mind. In the second stage or zoötheism this attribution of extra-natural and mysterious potencies is confined to animate forms and animals, usually by reason of some special quality, as strength, swiftness, cunning, etc., become deified. In the third stage, to which he gives the name physisotheism, the agencies of nature, sun, moon, stars, rain and wind become personified and exalted into omnipotence. The fourth stage, which includes the domain of the spiritual concept, has not yet been reached by any of the Amerindian tribes. None of these stages exist in pure form

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<sup>1</sup>Powell: An. Rep. of Bureau of Ethnology, 1879-'80, p. 29.

but overlap and exist together in the various stages of development. The second of these divisions, there is nothing in the present subject to draw out, but the animistic and physitheistic stages are clearly traceable in the development of the child's imagination. Turning first to the Indians' attitude toward the dawn as expressed in myth and tradition, we find among the Navahos<sup>1</sup> many traditions of wonderful houses built by the gods and by the mystic founders of their race. A keen appreciation of color and the beautiful effects of morning light are manifest in these stories. These mythic houses were built of pearly shell and turquoise, of the mists of the dawn and the brilliant colors of sunset; they were covered with woven rainbows, gorgeously tinted clouds and all the richest hues of earth and sky. The ceremonials still used in the house building of the Navahos have reference to these mythic abodes. The door is still placed toward the east so as to be directly open to the beneficent influence of the dawn god, who was the benevolent nature god of the south and east, while the sunset god was not always so benignant. <sup>2</sup>Among the Sioux, in illness, prayers are addressed to the dawn god for health and life. Among the Navaho mountain chants given by Matthews<sup>3</sup>, the dawn is described as the Daylight Boy or the Daylight Girl and the curtain of daybreak as hanging in beauty from the land of day or the land of yellow light. The feeling in this is not far removed from that in the Vedic hymn to the dawn where "She rose up spreading far and wide and moving toward every one. She grew in brightness wearing her brilliant garment. . . . She shone gold-colored, lovely to behold," and the prayer addressed to her is "Shine for us with thy best rays, thou bright dawn, thou who lengthenest our life, thou the love of all, who givest us food, who givest us wealth."

Among the Navaho myths is one of the origin of the sun and the manner of its first rising which wrought out with much detail and wealth of imagination. <sup>4</sup>When the Navaho first ascended into this world they found only darkness. They prayed for light but their prayers availed nothing. So they sent for the turquoise woman and the white shell woman who lived in the Ute mountain. These two women told the people to have patience and their prayers should be answered. Now night had a familiar and this person whispered in his ear, "Send for the youth at the great falls," so night sent a shooting star as a messenger. The youth came and said to the turquoise woman "you should know what to do," so with a crystal dipped in

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<sup>1</sup> Mindeleff: An. Rep. of Bureau of Ethnology, '95-'96, p. 487.

<sup>2</sup> Dorsey: An. Rep. of Bureau of Ethnology, '89-'90, p. 468.

<sup>3</sup> Matthews: An. Rep. of Bureau of Ethnology, '83-'84, p. 463.

<sup>4</sup> Stevenson: An. Rep. of Bureau of Ethnology, '86-'87, p. 276.

pollen she marked eyes and mouth on the turquoise and white shell beads and forming a circle around these with the crystal she produced light, but it was insufficient. Then the twelve men who lived at each of the four cardinal points were sent for. In their presence the turquoise woman sang a song but even that failed to bring the light. Then the twelve men of the east placed twelve turquoises at the east, the twelve men of the south, twelve white shell beads towards the south. And in like manner twelve turquoises and twelve white shell beads were placed toward the west and north and with a crystal dipped in corn pollen encircled the whole, but still the light did not come. Then the turquoise woman held the crystal over the turquoise and it blazed and "the great light" grew exceedingly hot. The men from the cardinal points tried to raise it but in vain. Finally a man and a woman appeared, from whence they knew not, who offered to raise the great light. But they succeeded in raising it only a little way. Then they made four poles, two of turquoise and two of white shell beads and with these the twelve men from the cardinal points raised it. But still they could not get it high enough to prevent it from burning the grass and the people. Then said the people, "let us stretch the world;" so the twelve men stretched the world and the sun continued to rise, but still it was not enough and the people crowded everywhere to find shade. Then darkness commanded them to keep stretching and at last the sun was just right. Then the turquoise woman commanded the twelve men of the four cardinal points to go to the four points of the compass to hold up the heavens and this they are still doing to this day. In this single myth, though abbreviated and stripped of many of its details, we find many of the elements which have appeared in the sun fancies of children, animism, personification of darkness, a constructive theory of sunrise and in its color imagery an appreciation of æsthetic effects of sunrise.

Personifications of the sun are almost universal among the Amerindian races. In Sia myth<sup>1</sup> the sun is personified as a warrior. He wears fringed and embroidered garments of deerskin and carries a bow and arrows; he wears a mask with eagle plumes to protect him from the view of the people of earth. He stops for breakfast, dinner and supper in his daily journey from east to west. The Utes<sup>2</sup> believe that once the sun roamed over the earth at will but having scorched the earth by coming too near, he had a fierce conflict with Ta-wats, the hare-god, and having been conquered was condemned by a council of the gods to ever after cross the heavens in an ap-

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<sup>1</sup> Stevenson: An. Rep. of Bureau of Ethnology, '89-'90, p. 36.

<sup>2</sup> Powell: An. Rep. of Bureau of Ethnology, '79-'80, p. 24.

pointed way. In indian myths the sun is usually masculine and the moon feminine, but sometimes the reverse is the case. In Cherokee myth the sun is a mother who every day stopped in the middle of her journey across the sky to dine with her daughter. She hated the people of the earth because they screwed up their faces whenever they looked at and was jealous of her brother, the moon, because he liked the earth people. Because of this, every day as she came near her daughter's house she shot down such sultry rays that the people died by hundreds. So they sent the rattlesnake to kill the sun but meeting the daughter of the sun coming from the door he killed her instead. Then the sun grieved and wept so much that the earth was darkened. So the earth people sent a number of their young men to the "darkening land" in the west to try to bring back her daughter, but having failed in the attempt the sun gave herself up more completely to her grief. At last, the sun dance was devised in the hope that it might divert her, and becoming interested, she at last smiled again. Among the Eskimo<sup>1</sup> the sun and moon are sister and brother and the sun is ever pursuing the moon, and when she comes near the moon dodges behind the dark to escape observation. In Sia<sup>2</sup> myth, the sun was created by two mysterious old women who having finished it dropped it behind a high mountain whence it rose of itself. The moon was afterwards created as companion and brother to the sun. Among the Hidatsa<sup>3</sup> the worship of the sun is animistic. They have no idea what it really is, but sacrifice to it as a mysterious power. The moon is the sun of night.

The sun's rays as connecting paths between earth and heaven is a frequent idea in primitive myths.<sup>4</sup> In Cherokee myth, the earth is fastened to the sky with cords but "no remembers who did this." The children of the sun travel on the path made by the rainbow and sunbeams to reach the home of their father. Among the Sia the war heroes cross the land of the cloud people on the rainbow bridge as did the heroes of the Norsemen.<sup>5</sup> Among the Eskimo, the aurora forms this bridge and its light is due to torches held in the hands of spirits to guide souls in their journey to the spirit land. In Navaho myth,<sup>6</sup> rainbows and sunbeams were regarded as consisting of "layers or films of material, and were carried about like a bundle of blankets."

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<sup>1</sup> Turner: An. Rep. of Bureau of Ethnology, '89-'90, p. 483.

<sup>2</sup> Stevenson: An. Rep. of Bureau of Ethnology, '89-'90, p. 35.

<sup>3</sup> Dorsey: An. Rep. of Bureau of Ethnology, '89-'90, p. 513.

<sup>4</sup> Mooney: An. Rep. of Bureau of Ethnology, '97-'98, p. 239.

<sup>5</sup> Stevenson: An. Rep. of Bureau of Ethnology, '89-'90, p. 39.

<sup>6</sup> Mindeleff: An. Rep. of Bureau of Ethnology, '95-'96, p. 488.

In comparing these sun fancies of a primitive race with those of civilized children, one can but be impressed with a similarity in the lines of mental development in the ontogenetic and phylogenetic series. The literal acceptance of things as they appear comes earliest, then as questions of how and why arise, the constructive imagination deals with the materials at hand, moulding them into fantastic shapes and varying forms, yet beneath all the diversity and variety run certain types of ideas in which we can discern a uniformity in the modes of mental reaction to objects of nature. Are not these childish and fantastic interpretations of natural phenomena a normal stage of growth in the mind of the child, a sort of mental gymnastics which play their part in development of the creative powers of the mind? Have not those who have never watched the sun rise and set missed something of real educational value, apart from the æsthetic enjoyment? Is not the precept<sup>1</sup> of the Ottawa Indians expressed in their third commandment worthy to be followed?

"Look up into the skies often, by day and by night, and see the sun, moon and stars, which shineth in the firmament, and think that the great spirit is looking upon thee continually."

One characteristic psychic change of adolescence is seen in its reactions to sunset and twilight. Little children show clearly the physiological effects of the withdrawal of the immense stimulus of light and grow quiet, perhaps a little depressed, or, if over tired, uneasy or sleepy. They dislike solitude, are more or less definitely timorous, cling to others, etc. It is the chief story hour. Sunset is beautiful for its brilliant colors and other optical effects, and their fancies about it are chiefly physico-mechanical or anthropomorphic. With the pubescent all this is changed. The hour of closing day, when the soul is directly exposed to its influences, opens up a new life of sentiment and mysticism. As sense is dimmed, soul comes forth. There is a deeper, sacred, symbolic meaning to it all. Conscience awakes, if not in the form of reproach, in aspirations for a new and better life. The peace and purity of the evening sky is reflected in the moral nature. The isolation of gathering twilight brings solitude; the soul is alone with itself face to face with duty and ideals. There are new longings for a larger, higher life, a desire for more self-knowledge and self-expression. A sunset is a sermon, and "betwixt the gloaming and the mirk" is the time for music, favorite hymns, for

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<sup>1</sup> M. E. Chamberlain: Precepts of the Ottawa Indians, *Am. Jour. of Folk-Lore*, Vol. V, p. 332. These are the precepts by which the Ottawas were governed in their primitive state before coming in contact with the white races.



heaven and God seem near, as well as for philosophic thought and reflection. It is the hour, too, for reviewing the day, for moralizing, dreamily though it be, and for resolutions for the future, for ambitious plans for adulthood, castle building and reverie, often the best expression in the young of spontaneous psychic growth, when every one's muse, if he has one, stands nearest him. In the great hush and peace, the imagination is kindled. Much is thought and talked of that would be impossible by garish day. It is for plain, lucid prose, but now is the time for reading or even writing poetry, when so many in our returns invoke their muse. Some would compose new music; sing something wildly weird and sad; tell sweet thoughts, if only to themselves or an imaginary companion; let the mind wander away and away; shunning every noise and intrusion in an abandon of delicious depression, which is perhaps an after effect of the crude childish fears which now in large measure and rather suddenly fade. Pedagogy, especially that of religion and art, have here a great opportunity and perhaps will one day rise to its duty and construct a vesper service that, while not without shelter and comfort exposing the soul to all the sensuous phenomena of slowly gathering night, will devise adequate expression for the instincts that now turn the soul inward; make it feel the need of protection and trust; preform it to walk by faith and not by sight; strengthen the feeling of dependence; anticipate the evening of life and the great sleep that wakes not. This is the way the soul should descend into the dark valley, "like one who wraps the drapery of his couch about him and lies down to pleasant dreams." This is the hour of sentiment and should be sacred to its culture.

This questionnaire does not follow declining day to the blackness of night. As darkness becomes complete, the waking child feels its helplessness. It can neither resist or fly, and they realize that any creature that had eyes that could pierce it would have it at its mercy. Vestiges of the throngs of night terrors of which we perhaps inherit at least the predispositions may be revived and pass beyond control and shake the very soul. How phantasmal these are is seen in the fact that many suffer from this a lifetime and never tell and never take active precautions to fence out even the most familiar phobia objects.<sup>1</sup> Something seems moving, noises are magnified, flitting forms fancied, dim outlines take horrid shapes, unseen hands are just ready to grab, we must look behind, we do not fear ghosts but our muscles are tense and we are all goose flesh, the head is covered at night almost to suffocation, every crevice of the bed-

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<sup>1</sup>See *A Study of Fears*, by G. Stanley Hall, *Am. Jour. of Psy.*, Vol. VIII, p. 183.

room is examined and the light is falteringly put out with a prayer, the breath is held, often very vivid and definite pictures are painted and may persist and recur nightly for years, etc. Sight gives us warning of approaching touches, but in the dark they may come with a shock, and that human nature and nerves must abhor. Darkness first divorces thought from sense, which it is prone to follow so closely in childhood, and as fear and pain were perhaps in the unhappy past stronger stimuli than pleasure and so now are most prone to arise. The old night of ignorance, mother of fears, yet rules our nerves, and its images are still "*freisteigende*." From many points of view, hygiene, morals, æsthetics, the pedagogic importance of the early stages of acquaintance with darkness is great.

Man's control of fire enables him to defer night. Evening is the result of a progressive evolution that has taken man farther and farther from the life of nature and made him already nearly semi-nocturnal. Primitive races linger about the camp fires a while and recount the past, converse and still the mind for repose, and are up with the dawn. Many birds and animals retire with but are up before the sun, prolonging day at its best and not its worst end. This is explicable by the laws of fatigue that tired brains need greater stimulus to keep them awake than rested ones. With civilization even curfew is abandoned, hours are later, lights brighter, excitement greater, and more artificial, and as the fatigue sense is itself fatigued abandon grows, reserve forces are drawn on and neurasthenic states invited, abnormal excitants made habitual and the normal ones of morning neglected. Childhood still tends to follow the sun in its periodicity of activity and repose, but when after twilight has begun its slow somnolent magic, its charm is suddenly broken and the lights are turned on, fatigue is defied, and a fevered state of mind that is marked by abandon. Abandon supervenes as the hundreds of thousands retinal fibres carry inward the sudden arousing effects of light that are over-exciting and to which the system is slowly broken in to with such adjustment as it can make. City life is especially hard on the normal influences of night and many a cure is wrought by re-establishing its power in the country.

One cause of the noise, frolic, wildness, rise of spirits, talkativeness, excitement, etc., when the lights are brought in, is perhaps that twilight had already begun its recuperative effect and accumulated a small stock of fresh energy, which according to some theories, because but just accumulated, was more labile and not yet fully diverted to anabolic processes. This view is favored by some mentions that it lasts half an hour or an hour before fatigue recurs. Another factor is that the artificial light comes suddenly and not slowly as daylight fades and so has

some of the effect of a shock, discharging large stores of energy. Again evening illumination is concentrated in jets, flame, etc., which focus attention instead of being diffused like daylight, and finally its physical quality, color and composition is different. Snatched backward against the currents that tended to sleep, some flush with the slight degree of awakening become tense and alert, from talking, which the bashful can do best in the dark, they turn to action, or stop fretting, break out in boisterousness, "cut up," in the evening become electric although in the morning they will be hectic. Even turning up the lights in church, or before the acts in the theater, gives pleasure and tension and habit may make daylight seem commonplace, and the inebriation may come to crave red and other colored or very intense calcium and electric illumination, and the chief pleasure even of evening amusements be found in the light stimulus which to weaker brains or retinas causes depression, or to those over-strained by the fears of night-time, may bring sleep, all the complex and as yet imperfectly explained physiology of which is a direct result of the withdrawal of light. Sleep is in the main the exact biological expression and result of darkness. Although the blind and arctic people maintain the daily rhythm it is largely because their entire organization was formed under the influence of diurnal alternation of day and night. In creatures that hibernate and aestivate the rhythm is seasonal, prolonged and interrupted. Beyond the arctic circle, spring is one prolonged dawn inebriation of light and warmth, autumn a protracted evening depression of nearly all functions of body and mind, when even passion sleeps and sociability is diminished.

The effects of artificial light, while in a measure comparable to those of sunlight, produce certain psychic and physiological changes of so marked a character as to place them in a class by themselves. The data asked for were cases of exhilaration resulting from the overcoming of early darkness by lighting the gas or other artificial illuminants, and the effect of open fires. Of 291 adults answering the syllabus 197 had personal experience of the exhilarating effects of artificial light, and 62 had never noticed any effect. To the 197 personal experiences are to be added 32 cases of observation of children making 229 or nearly 79% of the whole number of cases in which an effect of exhilaration due to artificial light was noted. The degree of this varied from a slight increase in mental or physical activity to cases of actual abandon in children where the effect became distinctly abnormal and interfered with natural sleep. It is evidently conditioned by the brilliancy of the light, as many of the 62 who observed no effect speak of "lighting the lamp," etc., while in all the more marked cases either electric light or gas was mentioned or there was some direct statement in regard

to the more stimulating effect of brilliant light. A few examples of the returns are here given.

F., 18. I have noticed that when it begins to grow dark children become drowsy, but as soon as the lights are lighted they begin to frolic and are more active.

F., 19. I have never felt excited when the lights were lit but I always feel a rise in spirits at the time.

F., 18. When a child I was so very happy when the light was lighted that I would dance around and scream and make a great deal of noise. Even now my spirits rise when the lights are lighted or I am in a brightly lighted street.

F., 18. A little boy whom I have seen a great deal of will sit quietly during the twilight hour. But as soon as the lights are brought in he is anxious for a game of blind man's buff or some other game which requires a great deal of action.

F., 17. I do not remember that when I was a child that the light excited me very much. Now the light in a theater or a brightly lighted room always excites me.

F., 18. As a child I was always extremely fond of having the lamp lighted as I thought it made things much more cheerful but I never became extraordinarily excited about it. At the present time my spirits usually rise in a well lighted room.

F., 25. Different degrees of artificial light affect me very decidedly. Under brilliant electric light I feel full of life and nervous energy. I can think more quickly and am apt to feel buoyant. The effect is like that of a stimulant. Lamplight is to me quieting, a light to study and to read by and in which to look at things calmly, while ordinary gaslight has the most depressing effect and I am rarely happy or lighthearted under it.

F., 18. I think that the presence of artificial light at the opera has had an influence upon me. My body immediately becomes tense, my eyes alert. My interest in everything around me becomes stronger. The same thing is true when there is artificial light in the church and schoolroom.

F., 19. My spirits always rose when the lamp was lighted and were usually higher when for some reason we had more than an ordinary illumination.

F., 19. As a child when the lights were lighted I would begin to frolic and play. Now I feel my spirits rise and feel like dancing, laughing and enjoying myself when a house or room is brilliantly lighted.

F., 18. I observed a child five months old. When it began to grow dark he was fretful and cross but as soon as the lamps were lighted he would grow very happy. He seemed to enjoy looking at the light.

F., 19. One of the greatest pleasures I ever had was upon seeing two clusters of lighted candles (one hundred in each) suddenly brought into a room growing dim with twilight. The people shouted, chattered and laughed for a long time afterward.

F. While making an evening call in a house lighted by electricity a baby was brought in from a darkened room. The child instantly hurried toward the light and seemed so fascinated by it that it was impossible to attract his attention. As his mother changed her position, the child persistently turned toward the light.

The number of returns in regard to the effect of open fires was limited by fact that many of those answering the syllabus had never lived in a house with open fires, and therefore had

no experience of its effects. 149 considered the effect good, 13 bad, and 16 had never noticed any particular effect. The reasons given for considering the effect good are in condensed form, it brings the family together, brings contentment and enjoyment, produces a feeling of coziness, comfort and pleasantness, give a feeling of cheer and homelikeness, induces dreaminess and arouses the imagination. Reasons for an adverse opinion reduce chiefly to the fact that artificial excitement may be harmful in effect. A few examples of the various expressions of this idea are given.

F., 20. The development of evening which comes with fire is not good because it creates artificial excitement which is not good.

F., 19. In some cases I think it is good but in other cases I think people can think better in the dark. Very bashful people can talk better in a dark room.

F., 19. I should think this development would not be good for young children as it would make it impossible for them to sleep quietly.

F., 18. I do not think the excitement which comes with fire is good. I think that the child ought to be so exhausted with his day's play that at night he would not be able to romp and race. I think this excitement is unnatural.

To these data on the effects of artificial light gathered by questionnaire may be added the well recognized psychic effects of artificial illumination on both actors and their audiences, the use of artificial light at social functions even during daylight hours, and the use of illuminations, fireworks and torchlight processions as a stimulus to political enthusiasm during campaigns. For a full treatment of the subject, a study of the use of light in the treatment of disease, psychic effects of electric light baths, etc., would be necessary. The question of how far these effects are to be considered normal and desirable or as an undue stimulus of the nervous system and emotions can be fairly answered only after an investigation of both the physical and psychic elements entering into these reactions, and here, as well as in reactions to sunlight, cases of negative phototropism must be taken into consideration.

The next two topics differ from those already considered in being the result of direct observation, and to the 389 observers must be accredited observations on large numbers of children which cannot be given statistically owing to the fact that the exact number of children observed was stated in but few instances. The questions asked were

What have you felt or observed in children, (a) when a dark cloud passes over the sun; (b) when from a bright field they enter a dark, dense forest or a deep, shady valley; or in both cases, *vice versa*? Illustrations of children's phototropism and love of being in the sunshine, independently of its thermal effects, for light alone. Are there psychic effects of unusual brightness like the sun or new snow?

237 observers note psychic effects of depression more or less marked from the passing of a cloud over the sun. 9 record an opposite effect and 46 no effect; 34 state that they have never noticed. Some of the words used to describe this effect upon children are that the child seems timid, sober, quiet, disappointed, dull, gloomy, spirits droop and face clouds. The depressing effect of passing from a bright field to a dark, dense forest or shady valley was noted by 214 observers and described as depression, awe, quiet, timidity, or that children seem subdued, hushed, thoughtful, gloomy, lower their voices, talk in whispers, cling to each other or to an older person. Only twelve whites and thirty-four colored give a different impression and, in the latter case, thermal effects are probably a modifying influence. The reaction to a bright, cheerful mood on emerging into sunshine is given in every case. 132 report an exhilarating effect from the sun shining upon new snow. 23 (of which thirteen state a weakness of the eyes) dislike the effect. 284 observers report cases of special fondness for sunshine, a large number of children being included in these observations. Only eight cases of dislike of sunshine were noted and three of these were due to weak eyes; the other five "did n't like it because it was too hot." Two liked it sometimes "but not all the time." For the fact that blind children react to these changes in a manner similar to seeing children we are again indebted to Dr. Anagnos.

"The blind are generally susceptible to the influence of the sunshine and gray skies of day but indifferent to the change from day to night.

"A. says that the blind realize whether they are in the dark or light and, on entering a room, know where the windows are and how many, without contact. Keen sensitiveness to thermal effects and to sound will tell them whether a room is lighted artificially or not.

"C. is often affected by atmospheric changes, irrespective of thermal conditions. He can detect slight difference in atmosphere—knows when it is clearing before a seeing person does and feels the influence of coming rain while the sun is still shining and before there is any indication of a change of weather to a seeing person."

The character of the reactions in both adults and children is illustrated in the following extracts from the returns.

*Effect of Dark Cloud over Sun. Adults.*

F., 19. When a dark cloud passes over the sun I always feel a sense of dreariness. When the sun shines brightly on the snow my spirits always rise and I feel like doing something.

F., 18. Whenever I as a child or even now watch a dark cloud pass over the sun there is a kind of sinking in my feelings and I watch with

great anxiety to see if the sun will come out again and when it does I always give a sigh of relief. Whenever I see the sun shine on the snow I always feel brighter and walk more vigorously.

F., 19. I have often felt a little fall of spirits when a dark cloud passed over the sun, and when it was a decided change as in the dark clouds before a storm I have felt and still feel a sort of awe.

F., 18. As far back as I can remember I have felt a fall in spirits when a cloud passed over the sun. As a child I often felt that the clouds had no business going near the sun. About the age of seven I remember having the feeling that the clouds were teasing the sun.

F., 18. When a cloud passes over the sun it has rather a depressing effect, and when the sun comes out again I seem to feel happier and light hearted.

F., 17. When a cloud passed over the sun I always thought that God was displeased at something I had done and had sent this cloud as a sign of his displeasure. I seemed afraid and would say a prayer. I must have been somewhere between seven and ten years old when I thought this.

F., 17. I have noticed that when a dark cloud passes over the sun children often stop in their play. I noticed only a few days ago a little boy about three years old playing soldier and when a heavy cloud passed over the sun he stood perfectly still and remained quiet until the sun came out again.

F., 20. When a dark cloud passes over the sun, it seems to tend to make my usually bright spirits lower. When a child I thought that God passed this shadow on the sun when some one had displeased him. (5 yrs.)

M., 17. Whenever a cloud passed over the sun, I would chase and throw stones at the shadow and would often run shadow races.

F., 18. I can remember at times having felt a sudden fall of spirits when a dark cloud passed over the sun. I have also felt the same effect in going from sunshine to the darkness of a thick wood.

### *Effect of Cloud Passing over the Sun. Children.*

F., 17. I have noticed when a cloud passes over the sun, a cloud also passes over the child's face and his spirits fall. Children like to be in the sun and often carry their playthings to a sunny part of the room.

F., 16. I have sometimes felt disappointed or chagrined when the sun is hidden by a dark cloud.

F., 21. I knew a little child who used to say that somebody blew the sunlight out when it went behind a cloud and as soon as it appeared again he was very happy and said that some one had lighted it again. He watched the cloud eagerly to see if the sunshine would not be lighted again.

F., 19. I have noticed a momentary pause and hesitancy in children while at play if the sun passes behind a dark cloud.

M., 18. In observing children when a dark cloud passed over the sun I noticed that it seemed to diminish their energy.

F., 20. When a dark cloud passes over the sun children become less sportive. They are quieter and if the sun remains obscured for a long time, they seem to lose life and play with less energy. Frequently a tendency to quarrel seems to arise when before they have been playing quite happily.

F., 19. When a dark cloud passes over the sun I have noticed a look of almost fear upon children's faces. They stop their play and grow quiet.

F., 20. I have often noticed children when a dark cloud passes over

the sun. A look of blank astonishment seems to pass over their faces, and their play seems to lose its merriment.

F., 17. I have noticed that when a cloud passes over the sun, children seem to lose their merriment and do not play as energetically.

*Effects of Passing from Sunshine to Dark Woods.*

F., 21. I have observed that children on passing into the woods from the bright sunshine become very quiet and want to be near an older person.

F., 20. On entering a dark wood from a bright field, the spirits of children I notice, become subdued, but after they are once in the woods the effect seems diminished. On going from a dark forest to a bright field the opposite effect is produced and the children often become hilarious and throw their caps in the air or skip along joyfully.

F., 20. When children pass from a bright field into a dark, deep forest they seem to feel a sort of fear. They cluster together as if seeking protection from one another. On emerging from the wood they begin to laugh and chatter and run about.

F. Whenever I go from the bright light of the sun into the shadow of the woods a feeling of awe always comes over me.

F., 20. As a general thing as I go from the sunlight into the woods I have a feeling of loneliness.

F., 17. Whenever I enter a dark, dense forest, or a deep, shaded valley I felt I was in a resting place and must be very quiet.

F., 17. When I go from sunlight into the woods my spirits droop and I have a feeling of awe and solemnity. Yet while in the woods I thoroughly enjoy everything around me.

When the woods hid the sun from me I felt as if I were in some sacred place and tried to breathe softly so that no one would hear me.

F. In going into thick woods from bright sunlight a feeling of awe and solemnity comes over me. It does not seem the place for much talking.

F., 18. When I have gone from sunshine into dark woods a feeling of gloom and melancholy has come over me.

When I go into a thick wood a feeling of dread passes over me.

F., 20. When from a bright field, children enter a dark, dense forest they keep close to each other, stop shouting and talk in low voices, sometimes in a whisper. As soon as they come out into the sunlight again they begin to talk louder and are soon shouting at the top of their voices.

F., 21. When children from bright sunshine enter a shady wood, they lower their voices and take each other by the hand. On emerging into the light they run, shout, laugh and play.

F., 21. I have often been in a dark wood with children and they would cling closely to me while I told them about birds and flowers, but as soon as we came out into the sunlight they would all run ahead and play their own games.

F., 19. Children may be running along and playing merrily but as soon as they enter shady woods, I have noticed that they quiet down, walk closer together and talk in lower tones.

F., 19. I often go for a walk with my little sister. As long as we are in the fields she is talking and laughing but as soon as we enter the woods she stops talking and walks quietly along. If she speaks, it is in a lower tone.

*Cases of Phototropism.*

F., 18. I have noticed children change their place of play when it became shaded, if in the morning they played on the east side of a tree the afternoon would be likely to find them on the west side.



F., 17. A little baby cousin who had just learned to creep always crept toward the sunshine when placed on the floor.

F., 18. I always liked the sunshine and sat in it whenever possible.

F., 18. I always loved the sunshine and felt that if the sun would only shine I could do what I was trying to do so much better.

Examples of children's phototropism frequently given: play on sunny side of room, on sunny side of street, disregard heat to play in sunshine, disregard cold to play in sunshine, babies creep towards the sun on carpet, children always happier and more active in sunshine.

F., 19. I have always had a peculiar liking for sunshine. As a child I always wanted to play on the sunny side of the street.

F., 23. As a child I always loved to sit in the sunshine. I would sit in the sun and read half a day at a time.

In the winter, when the sun was shining on the snow, I always felt happy because everything seemed so bright and cheerful.

M., 13. I like the sun sometimes.

The phototropism of children as well as that of adults and animals has a negative as well as a positive side. It seems to be subject to fatigue. A child who has played in the sun until tired and sleepy does not, as a rule, want to sleep in the sun but craves the opposite conditions. Travellers in Greece often speak of the brightness of the light which, after a time, seems to become positively painful and a gloomy day would be hailed with relief. The construction of the Egyptian houses with their cool, dark, interiors was probably influenced by this negative reaction from the white light and blinding glare of the desert. While in hot climates these reactions are undoubtedly complicated with thermal effects, there is still an influence due to light alone. <sup>1</sup>In experiments with the lower forms of life thermal effects have been cut off by the interposition of a screen which permits the light rays to pass, while cutting off those of heat and both positive and negative reactions have been obtained. <sup>2</sup>Greeley notes the insomnia and restlessness consequent upon the long Arctic day, and the necessity of establishing a fixed routine, to insure a proper amount of rest for his men.

Some nervous systems like some complexions are at their best in higher lights than others. Experiments show that blinded frogs tend to prolonged sleep, and the blind live on a very different photometric level from the seeing. Blind children, if not especially cared for, are undeveloped muscularly from their reluctance to move about. Those who see, differ widely in their optimum of light. Very brilliant light has a marked

<sup>1</sup>Yerkes: Reaction of Entomostraca to Stimulation by Light, *Am. Jr. of Physiology*, Nov., 1899. Parker and Burnett: Reactions of Planarians with and without Eyes, *ibid.*, Dec. 1900. Towle: A Study in the Heliotropism of Cypridopsis, *ibid.*, March, 1900. Parker and Arkin: Directive Influence of Light on the Earthworm, *ibid.*, April, 1901. Verworn: *Physiologie*, p. 434.

<sup>2</sup>Three Years of Arctic Service, Vol. I, p. 117.

effect on the mentation of the feeble-minded. Some children endure more dark days, darker corners than others without becoming either lazy, somnolent, irritable, or dyspeptic. Average children are so sensitive that a small cloud passing over the sun causes a noticeable depression of spirits, activity, or both. They falter in their play, are less merry, hesitate, pause, and neurotic children often shiver and catch their breath. As the period of reduced light increases to hours or days or as the degree of its intensity diminishes, they speak more softly, whisper or are silent, grow less energetic in their movements, their spirits sink, the quality and quantity of work in school declines, their standards and ideals droop, they are slow and inattentive, all tasks seem harder, the appetite is enfeebled and freaky, pugnacity increases, they are very easily discouraged, huddle, clasp hands, cling about each other or adults, suffer from *ennui*, are prone to collapse attitudes, are lonesome, homesick, etc., but when the sun breaks out, especially on new snow, their exhilaration, noise, activity and joy is boundless.

The returns clearly suggest that adolescence is marked by some change in this respect. Low lights are often craved for the relaxation they bring. A day of rain is a benediction because it relieves tension, and the sombre moods are less shunned and often craved and bring some of the effects of twilight. The complexion effects are now first prized and bring a new aversion to dull days. The effects of both bright and dull light are less purely physiological and more psychic. Young children are often inert and irritable, but pubescents are more consciously depressed and able to give expression to these sentiments, trace their causes, etc.

### *Psychic Effects of Sun on New Snow.*

F., 17. Although the sun on the snow hurts my eyes, it seems as if all the world were brighter and my mood is pleasanter.

F., 19. After a snow storm a change to a sudden outshining of the sun produces a decided change of feeling from one of heaviness to a light and more joyous one.

F., 17. The sun shining on the snow made me feel bright and happy and full of life.

F., 18. When the sun shone brightly on the snow I always felt very happy and wanted to make other people happy.

F., 18. Seeing the sun on the new snow always makes me feel glad to be alive and gives me new courage and inspiration for work of all kinds.

F., 16. I always got into trouble in school when the snow was on the ground. I do not know why but the fact remains.

F., 20. A bright day with snow on the ground has always made my spirits high.

F., 19. I never feel dull or lonesome when the snow is on the ground.

F. The sun shining on the snow makes everything more bright and cheerful.

F., 18. The sunlight on snow had a tendency to make me feel brighter.

F., 18. A bright day in winter with the sun shining on the snow energizes my spirits and I feel stronger than on other days.

F., 24. When I see sunlight on snow I have a feeling of warmth and it seems to act as a tonic to my feelings in general.

F. A bright snowy day in winter always exhilarates my spirits.

F., 19. The brightness of the snow in sunshine always made me feel happy.

Summarizing briefly the effects of shade and sunshine, it is evident that there is a close connection between the general feeling tone and the amount of direct sunlight. With the obscuring of the sunshine a chill seems to fall upon children, there is a drooping of the spirits and play is less vigorous and spontaneous. While the effects are more noticeable in children, adults are also affected by photometric changes even those of short duration; sunshine, cheerful spirits and vigorous activity of mind and body seem co-ordinated, while gray skies and deep shade produce depressing effects, more or less marked, and a lowering of the mental and bodily activities.

The effect of the absence of sunshine for longer periods of time than those just discussed, on both mental and physical conditions, is well marked. The questions were

Have you observed any effects of a dark day or a series of them in school or elsewhere upon children or yourself; effects upon appetite, digestion, complexion, quantity and quality of work of mind or body; does a series of dark days bring you some rest; are pupils in the dark corners of the schoolroom more active or sleepy than those in its brightest part?

154 adults report personal experience of feelings of gloom depression and restlessness in addition to observations of children. 53 state that they have never observed any difference in their feelings. In 86 cases appetite was lessened while 54 report an increase in appetite which seems to be somewhat morbid, points noted being a desire to eat all the time, craving for sweets or unusual articles of food, craving for highly seasoned food, etc. 111 state that their appetites are not affected by weather conditions and 57 had thought about it. Digestion follows very nearly the line of appetite though no cases of improved digestion are reported as corresponding with increased appetite. The effects of dull days upon mental and physical work differ, the preponderating effect upon mental work being bad while upon physical work the good and bad effects are nearly equally divided. A direct comparison of results here is of interest.

Mental Work  
as affected by dull days.

Worse	80%
Better	17 $\frac{1}{4}$ %
Less	79 $\frac{1}{4}$ %
More	18 $\frac{1}{5}$ %
No effect	2 $\frac{3}{4}$ %

Physical work  
as affected by dull days.

Worse	38 $\frac{4}{5}$ %
Better	35 $\frac{1}{5}$ %
Less	35%
More	50%
No effect	15%

These results show that for a large proportion of adults mental work is poorer in quality and less in quantity than on bright days while the effect upon physical work is variable. In the case of children the testimony is almost unanimous as to the deteriorating effect of dull days in the schoolroom. Some of the phrases used repeatedly to describe these effects are dull, peevish, cross, irritable, mischievous, hard to keep in order, do not concentrate attention, fidgety, sleepy, low spirited, idle, hard to teach, hard to interest, difficult to gain their attention, slow of comprehension, unresponsive, etc. These effects upon both children and adults are brought out in the following quotations from returns.

*Effect of Dark Days on Adults.*

F., 17. A series of dark days makes me gloomy and fearful as if I would cry out against the dull atmosphere. It is more difficult for me to keep my attention on my lessons and I feel sleepy.

F., 17. A series of dark days usually makes me very dissatisfied and cross. I cannot do so much studying but can do more housework and sewing and like to do it. It takes me longer to learn things on dark days, but I generally learn them usually well.

F., 18. On a dark day or during a series of dark days I never could study as a child and I cannot now.

F., 18. It is harder for me to concentrate my attention on my work on rainy days than on clear ones, but I cannot see any difference in the quality of the work.

F., 24. A series of dull days affect both the quantity and quality of my work. I have observed that I can do less school work on a dull day, but more of such work as sewing, fancy work and manual training. On a clear day I can do better school work than on a dull day.

F., 18. On dark days I cannot do as good thinking as on other days, but I can do manual work and pleasant reading with more contentment than on other days.

F., 17. On a dark day I can work a great deal better than I can on a clear day. My brain seems clearer and there are not so many outside things to attract my attention. Dark days make some children listless and inattentive.

F., 18. I have always noticed that when there was a dark day or a series of days I have not been able to put much attention on my studies. From about nine years old until now I have often noticed that on dark days my work is not so good and I cannot do as much as on a bright day.

F., 18. During dark days my work seems more difficult and irksome. I feel low spirited and homesick. The quantity and quality of my work is influenced. I find that I can neither do as much nor do it as well as on bright sunny days.

F., 18. Dark days always make me tired and depressed. I have a tendency to yawn all the time. I do less work and work that is not very good on dark days.

F., 22. A series of dark days always made me sad and gloomy. When a child I was always restless in school and did not do as good work as on clear days. I have noticed that children are more restless and their work is not up to the standard on dull days.

F., 17. Until the last two years I have been depressed on dark days and did not do as much or as good work. Now it is on dark days when

I cannot be in the open air that I put my mind on my work and accomplish more.

*Effect of Dull Days on Children in the Schoolroom.*

F., 23. I have noticed that on a dark day in school it is hard to get the interest or attention of the children and everybody seems depressed in spirits. I can never work as well on a dark day as on a bright one.

F., 18. A series of dark days always inclines me to make the children stupid; they do not take the interest in their work that they do when the sun is shining.

F. On a dark day in school I have noticed that it is harder to keep the pupils interested, harder to make them understand and harder to keep them out of mischief.

F., 19. I have observed that on dark days children are inclined to be troublesome or dissatisfied with things in general.

F., 19. A series of dark days in the school I used to attend had a remarkable effect upon both teachers and pupils. The children became cross and irritable and inattentive, while the teacher seemed depressed and cross.

F. A number of dark days in school or even one dark day, tends to dampen the spirits of the children. Things seem harder on such days and children do not seem to try so hard as on bright days. The quantity of work is lessened by a dark day and the quality is also affected. We do not seem to take the same pains with work as on other days but seem to think almost anything will do. We seem to lower our standard at such times and hence it is not a good time for delicate or trying work.

F., 19. I have observed that a series of dark days generally makes children cross. One little boy whom I know always becomes restless and irritable if we have rainy or cloudy days in succession. A series of dark days depresses me greatly. I do not know that it affects the quality of my work but it takes me longer to do it.

F., 22. I have noticed that on a dark day or a series of dark days pupils are more restless and lacking in attention. I am never so hungry on a dark day and my digestion is not as good. My complexion is sallow and my face seems to lose plumpness.

F., 18. I have noticed that on a dark day or a series of them, that children in school are more restless and it is harder to keep their attention. I always feel rather dull and never do as much or as good work as on a sunny day.

F., 22. A series of dark days makes children restless in school. They do not apply themselves to their work so well.

F., 19. If the day was dark my lessons in school were always a bore and I longed for something strange or startling to happen. In most cases I think pupils are depressed on dark days.

F., 23. I have frequently had occasion to observe the effect of a series of dark days in the schoolroom. The children become restless, hard to control and new devices must be used to hold their attention. Lessons are not as well learned, tendency to sulk is more frequent and the atmosphere of the schoolroom seems depressing.

F., 18. A dark day or a series of dark days has an ill effect on the children. They become depressed, worrisome and tired and very often the teacher undergoing the same effects of depression, makes the schoolroom anything but an ideal place.

F., 21. On dark days children are cross, restless, uneasy, dull, slow of comprehension, peevish, inactive, irritable, do not respond readily, are sleepy.

F., 19. I have noticed that a dark dismal day makes one feel dull and without animation. I have particularly noticed this in second year school children.

Effects upon the complexion are described as follows:

F., 20. My complexion is dark and sallow on a dark day.

F., 17. My complexion is much darker and duller on a rainy day (brunette).

F., 18. I have noticed that after a series of dark days, I usually have a very sallow complexion though ordinarily I have a good deal of color. I have also noticed this to be true of other people.

F., 18. After a series of dark days my complexion is paler than usual.

F., 18. I become paler and dark rings form under my eyes.

F., 19. On dull days my complexion seems deadened and it is not generally the same color unless the day be damp. A warm dampness has a tendency to produce higher color and increase freshness.

The effect of a dark day on many people is to make the complexion pale and the eyes duller.

The effect of sitting in dark corners of the schoolroom is very similar to that of dark days. 75 per cent. of the observers report that children seated in dark corners are less active mentally; a number add to this statement they are more active in mischievous ways while others describe the effect as sleepiness or dullness; one observer considered that children were more studious while the remainder had noticed. Some of the direct statements are:

F., 22. When seated in a dark corner of the room I could not do as good work. I noticed the same thing with my pupils while teaching and always gave the duller pupils the benefit of the light. I found they did better work in a good light.

F., 17. In my fifteenth year I sat in rather a dark part of the schoolroom and was then more inclined to mischief and less inclined to study than I have ever been before or since. I managed to study my lessons but my work was not up to the average.

F., 18. Pupils in dark corners seem sleepy and dull.

F., 20. Pupils in dark corners are less active in school work and more active in mischief.

Only 14% of those answering the syllabus found any restful effect from dark days while 39% report an opposite effect, the remainder never having noticed any result in either way.

Effects on the blind similar to those on seeing children are reported by Dr. Anagnos, who says:

"The effect of dark days is to cause depression; they affect quantity and quality of the work. (C. adds, "and appetite.")

"A. found early in her teaching of totally blind children that they wanted the shutters open—especially at the top—and the light admitted freely. If sunshine flooded the room, so much the better.

"A. thinks long days of light give a feeling of lightheartedness; but neither B. nor C. gave indication of having such a

sensation and could not seem to abstract thermal conditions from their consideration."

Arctic explorers have noted both the mental and physical effects of long continued absence of sunlight during the Arctic night. An extract from Lieut. Lockwood's diary says: "The effect of continued absence of sunlight is very marked in the complexion of all the men as well as in their vigor. They are as blanched as potato sprouts in a cellar. The moral as well as the physical influence of sunlight is very soon seen after the sun's reappearance, the middle of Feb." Lieut. Greely speaks repeatedly of the mental irritation and depression which affected the entire party while at Ft. Conger and as comfortably situated as was compatible with Arctic conditions. The most marked symptoms which he notes were tendency to insomnia and the reverse, indisposition to exertion, irritability of temper and mental depression. He speaks in his own case of the difficulty of limiting his sleeping hours to a reasonable number, of applying himself successfully to continued mental work. He adds, "While free from mental depression, insomnia and feelings of lassitude which characterized some, yet I was at times affected by irritability of temper which it required a continued mental struggle to control. But few men were exempt from this symptom."<sup>1</sup> In speaking of the effects of Arctic night upon the complexion he describes the faces of the men as gradually acquiring a pale yellowish green color the full extent of which was not clearly revealed until the return of light. Dr. Kane and Nansen describe similar effects upon both the disposition and physical organisms of their men. Effects<sup>2</sup> even more pronounced than these and of a more serious character began to be observed at Ft. Conger about the middle of December, as at that time, some of the men under the influence of continued darkness began to show indications of mental disturbance. Appetites failed, and signs of gloom, mental irritation and depression were all increased, the Eskimo being more seriously affected than the Americans of the party and one of them wandering away without food or proper clothing during a fit of mental alienation. Though thermal effects must be taken into consideration in this connection we find Stanley under conditions varying as widely as possible,<sup>3</sup> describing with great vividness the sullen gloom and despair which settled upon his men during their long march through the great forest and the reaction when at last they emerged into the light of day. "They held their hands far out yearningly toward the superb land and each looked up into the bright blue heaven in grateful wor-

<sup>1</sup> Three Years of Arctic Service; A. W. Greely, Vol. I, p. 117, 154.

<sup>2</sup> *Ibid.*, 167.

<sup>3</sup> In Darkest Africa; H. M. Stanley, Vol. I, p. 282.

ship. After they had gazed as if fascinated, they turned their heads to the forest and shook their clenched hands at it with gestures of defiance and hate." Though these reactions are extreme and the product of unusual or abnormal conditions, they are, nevertheless, fully in accord with those of a normal type furnished by the returns. Reactions to light are in the direction of life, health, activity and moral growth; those of darkness in the direction of mental and bodily inactivity and, unduly prolonged, show indications of tendencies toward moral deterioration. The plea for well lighted schoolrooms scarcely needs reinforcement at the present day but it becomes a question of practical interest whether the morals as well as the physique of the dwellers in tenement houses might not be improved by a more liberal allowance of sunshine. Somewhat apart from the purpose of this study, but of psychological interest, would be a study of the use of light in the great masterpieces of literature. Dante revels in the use of light. It pervades the *Comedia* in every form, and to the contrasting use of shadow and darkness the *Inferno* owes many of its terrors. Throughout, in its moral significance, light is always the symbol by which the soul rises by successive stages while the souls in the lowest depths of hell are consigned to utter darkness. This is poetry and not science, yet Dante by that same marvellous insight by which he read the inmost secrets in the hearts of men seems to have anticipated the facts which point to the conclusion that these are mental, moral and physical effects of light and darkness which constitute no mean factor in the development of the individual and the race.